



# IT & Business Showcase

## 2020 Projects



Well connected. Right Here.





# Information Technology and Business Undergraduate Projects



## Introduction

Welcome to the compilation of Final Project synopses. These projects are undertaken by Graduate Diploma in Information Technology students and students in their final year of the Bachelor of Information Technology (BIT), from the School of Information Technology and Business at the Wellington Institute of Technology.

The synopses briefly capture the compulsory 450-hour capstone projects component that is available in both of these programmes. By working with the IT industry and various research and development specialists, students have been able to execute projects at no cost.

## The Qualifications

The School offers a Masters in IT, Graduate Diplomas and a Bachelor of Information Technology degree, with majors in five specialised areas (and an unendorsed option allowing students to design their own degree). This is developed and delivered in partnership with Whitireia Community Polytechnic.

The five specialised areas of the degree are:

- Software Development
- Networking and Infrastructure
- Cybersecurity
- Data Science
- Interaction Design

The Postgraduate Certificate, Diploma and Masters, along with the two Graduate Diploma programmes give a range of courses to choose from for a final project.

- Graduate Diploma in Information Technology (Level 7) has further options for students to gain a comprehensive understanding of specialist areas within IT and apply that knowledge by working on an IT project.
- Bachelor of IT students can dip extensively into the Graduate Diploma in Cybersecurity (Level 7) courses, and are offered experience in how to integrate security policy, practices and technologies into operational structures and explore the principles of survivability and information assurance, and students are able to use knowledge gained from some of the courses in this programme towards their final Project.

Students have the option of an alignment with many international industry certifications like Cisco, Microsoft, ISTQB, etc., and can utilise some credits from this towards their degree affording further depth and a wider scope in developing their Project.

Our Business programmes are “real world” qualifications. They provide a programme of study that is practical, focussed and delivers graduates that are work ready.

Research from employers consistently identifies the most important workplace skills as those of *communication*, *business knowledge* and the ability to *anticipate change*. Our programmes provide all these essential skills and, if you are studying on the Bachelor of Applied Business Management or the Graduate Diploma in Applied Business Management, specific technical skills within the chosen area of your major or strand.

### **What these projects are really about**

An capstone project, such as this, is intended to allow the student to refine the qualities that make them eminently employable. Our students select their own small teams and projects, and then work in independent teams, setting their own goals and pace in line with the project client needs. Students choose their own technologies, methodologies, and management practices in addressing both client needs and best industry practices. These projects represent: adaptability, responsibility, and perseverance.

With this in mind, and the arbitrary limits of 450 work hours we impose, many encounter 'expert overconfidence' – and must negotiate and manage new goals as the project progresses. This is a real learning curve for all project students, as in most of their studies our lab exercises are designed to work cleanly, but reality is never that tidy. They face real problems, and develop real solutions.

The other skill the students develop in this project is teamwork. Until this project the bulk of their studies have been individual efforts, now they must form a team, utilise their diverse skillsets, maintain relationships, and rely on others for essential parts of the puzzle – just like in industry!

For most students this project will be the last time they undertake a project from beginning to end – but they do get to experience the many facets of the project lifecycle, and hopefully make better career choices because of it. As our industries run mainly on projects, and has many specialisations within it, this project will help students find their best place in the industry.

### **Supporting the students**

This year the project coordinators were Robert Sutcliffe, Glenda Shaw, Scott Morton, Dr Fahimi Ali. Their task was to find and evolve the projects, thoroughly brief the students, set standards, and support them through the rough patches. They also audited the projects to get projects managerially back on track, co-ordinate all the assessments, and develop this presentation booklet.

The students also had regular access to an academic staff member for advice and guidance on matters ranging from technical, administrative, to relationship management.

### **Highlights of the Year**

The spread of projects this year are quite different to previous years as for the first time we have Business projects included – the defining characteristic this time is business diversity.

Enjoy the show, but please be gentle with them – many of them have had a hard time!

If you have a project idea you'd like considered by the students for a future trimester, please let us know:

Email: [Robert.sutcliffe@weltec.ac.nz](mailto:Robert.sutcliffe@weltec.ac.nz) or [Glenda.shaw@weltec.ac.nz](mailto:Glenda.shaw@weltec.ac.nz) or [scott.morton@whitireia.ac.nz](mailto:scott.morton@whitireia.ac.nz) or [Fahimi.ali@weltec.ac.nz](mailto:Fahimi.ali@weltec.ac.nz)

## 2020 IT & Business Projects

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30	<b>Kai Kitchen Event Post COVID-19</b>	Mya Misky	Dr Fahimi Ali	T2 2020
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35	<b>New Zealand First Aid Kit Market Competition</b>	Kevin Phan	Dr Fahimi Ali	T2 2020
36	<b>NMDF Project</b>	Anurag Regmi, Inderjit Singh and Purnansh Davawala	Drew Duncan	T2 2020
37	<b>Peer Evaluation</b>	Yao Lu, Kishan, Arun	Manish Singh	T1 2020
38	<b>Petrol Price Comparison App</b>	Nicole Priddey and Angela Yu	Terry Jeon	T1 2020
39	<b>Porirua War Stories</b>	Mansi Patel and Aateka Vohra	Aristotle Santos	T2 2020
40	<b>Porirua War Stories 2</b>	Kishan Gondaliya and Harpreet Kaur	Aristotle Santos	T2 2020
41	<b>Project Medici</b>	David Franck	Ian Hunter and Chaliner Baliuag	T3 2019
42	<b>Request for proposal process Improvement for an IT Services Consultancy Company</b>	Tali Blumgart	Dr Fahimi Ali	T2 2020
43	<b>RDANZI Web &amp; App System</b>	Piyush Sharma, Chandan Waila, UriahTwohill and Guautam Mehta	Dr Abdolreza Hajmoosaei	T2 2020
44	<b>RDANZI Events Management Website</b>	Jian Raga, Jinu Tharayil, Anand Sundaram and Kamalakar Uppala	Richa Panjabi	T2 2020
45	<b>Research Selection Expert System</b>	Avneet Kaur, Rohan, Jaideep Singh and Dhinakar Loganathan	Manish Singh	T2 2020

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46	<b>RFID Tag in a Laundry Business Operation</b>	Pardeep Kaur	Dr Fahimi Ali	T2 2020
47	<b>Sadhana Card</b>	Madar Shaik, Chirag Sitapara and Jay Gandhi	Sandeep Vankadari	T2 2020
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49	<b>SGRANCNZ 2020 – Rest APIs</b>	Gellio Gao and Louise Zhang	Dr Waqar Khan	
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56	<b>The Mountain</b>	Harry Lynch, Harry Atkinson and Zaq Muru	Susan Scott	T2 2020
57	<b>Tools and techniques to minimize the inventory shrinkage in Narayan Spice 'n Food Ltd</b>	Hardikkumar Sutariya	Dr Fahimi Ali	T2 2020
58	<b>Tournament Manager</b>	Preet Karan Singh Bhandari, Mohd Guffranshoeb Kasmi, and Harpreet Singh	Ian Hunter	T1 2020
59	<b>Tournament Manager 2.0</b>	Amber Li, AbdulHamid Lokhandwala and Shiva Kanta Ranam	Sandeep Vankadari	T1 2020
60	<b>Validation of IPv6 Network</b>	Lalit Dake and Vivek Panchal	Paul Bryant	T2 2020
61	<b>Wellycon</b>	Allen Shelly, Dhvani Patel, Amanpreet Singh and Pavel Klimov	Adrian Hargreaves	
62	<b>WelTec Online Event Registration System</b>	Jack Partridge and Ezra Turner	Drew Duncan	T2 2020
63	<b>'yourlife' Life Insurance and Facebook</b>	Olga Korotkova	Dr Fahimi Ali	T2 2020



# 1-1-SPA-1-2020 Salesforce

By: Darlene Moeke

Advisor: Dr Scott Morton

Client: S. Sullivan



Project Planning Session



Worked in Sprints



Gained a wealth of Project Management knowledge

## INTRODUCTION

The objective of the Capstone project was to provide Salesforce Functional Intern (SFI), with hands on experience in coordinating and analysing sections of a project.

The aim of the assigned project was to expand the Project Clients Customer Relationship Management Systems (CRM) core functionality with automation from the previous build.

Agile methodology was used to manage this project. The SFI was a Development Team member actively involved in completing items listed in Sprints.

## DEVELOPMENT

This project was a development from two previous phases. The build consisted of seven Sprints and with focus around:

- Expanding the Project Client's (newly implemented) core functionality with automation.
- Raising awareness to individual branches (throughout NZ) of how the Project Client assists and supports them.
- Building engaging relationships between the Project Client and individual branches.
- Implementing a process to track customer activity at each branch.
- Utilising tools within the system to enable the Project Client to develop fundraising capability.

## CONCLUSION

From overseeing this project, I fulfilled my Capstone requirements by gaining a complete understanding of how to coordinate/manage an out of the box project from beginning to completion.

The Project client's end users can navigate, configure, and operate their newly customised Customer Relationship Management (CRM) system; and this project has enhanced Davanti's Junior Salesforce Functionals (JSF) CRM problem solving and configuration skills.

The SFI found the most crucial factor to be communication. By Sprint 3, the Project client was utilising the Dev Teams communication platform of choice 'Jira'. This meant all communication was captured in one area specific to each item.

This was a great project to actively work in and Davanti Consulting Ltd is a great company to work for.

# 2a.nz URL Shortener

**Team:** Lewi Hardy, Nilesh Kishore and Moucheng Mao

**Advisor:** Drew Duncan

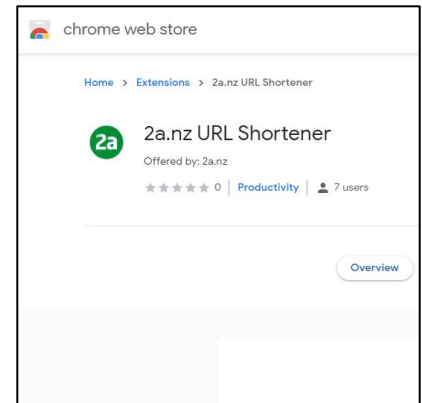
**Client:** Project Team



2a.nz URL Shortener homepage



Shortened URL overview page



Developed Chrome browser extension

## INTRODUCTION

The *2a.nz URL Shortener* is an advanced web tool that is used for the shortening of long URLs. Our website consists of a clean user interface targeted at users of all skill levels.

A key difference that sets ours apart from others in the market, is that we provide accurate data, useful detailed graphs, all 100% free and with no user sign up. Our generated URLs are also different in a sense that to increase readability we have excluded similar characters that are often difficult to read.

Using our site, a user would copy a URL that they intend to shorten, navigate to 2a.nz and paste the long URL to shorten. Alternatively, the user can use our Chrome extension to shorten from the page they are currently on. After that an overview page is visible with a shareable QR code, as well as a detailed statistics page which displays visual graphs and detailed user device and location information.

## DEVELOPMENT

The skills each team member gained from our studies at WelTec assisted with all aspects of the project. The team initially used a waterfall methodology, though transitioned to an Agile methodology when COVID-19 forced students to work from home. Starting with Waterfall had a significant benefit, which was a large effort being placed onto planning and system design, so minimal changes were made throughout the project.

Our lightweight but powerful web application was developed using the Python programming language. The team used Amazon Web Services (AWS) to host the CentOS server with several key applications installed such as MariaDB, Redis and Nginx.

Implemented into the project are several complex Python libraries which assist in the visualisation and processing of large amounts of data displayed on the statistics page. An API was used to associate a user's IP address with a precise location.

To assist the database and to improve performance by providing a caching system, the team have configured their service to use the open source Redis. Secondly the Tornado web framework was used, as it can handle a large number of concurrent connections, addressing the C10k problem.

## CONNECTIONS

The team added some features to their project that made a significant improvement to process and display 'big data' using more sophisticated graphical technologies.

The *2a.nz URL Shortener* was completed and is now in the public domain.

In the long-term further development has been discussed and there plans to add more features in the future.



# 3D Game – Ember

**Team:** Jake Hann and Tasha Vollmer-Selby

**Advisor:** Robert Sutcliffe

**Client:** Waqar Khan

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*Figure 1 Jake - Game Developer*



*Figure 2 Tasha - Game Developer*

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## INTRODUCTION

The product of this project is a first-person 3D fantasy adventure game, which has been developed using the Unity engine. The game revolves around a maze, which the users must navigate in order to escape, all while defeating enemies, solving puzzles, and collecting special items. This game is suitable for ages 10+.

The game will be used as a fun and interactive showcase of student achievement, demonstrating to prospective students what can be achieved when studying within the School of IT, Business and ESOL at WelTec, particularly when undertaking a software development major.

## DEVELOPMENT

This project was developed using the Unity real-time game development platform and scripted using C# and Visual Studio. The development of this project was accomplished using the SCRUM framework, with the team working in weekly sprints to achieve their goal.

Both the product and sprint backlogs were created using the project management software Trello, and the Unity collaborate function was used for version control. All assets used within the game were either provided by the client or freely downloaded from the Unity asset store.

The team developed the game in iterations, splitting the overall game map into sections, then starting from the first section and moving through to the last. Before moving on to the next section,

the previous section needed to be complete in terms of its design, physics, and detail.

While the environment was being developed, a member of the team was also working on the player class – their movement, weapon, and stats. Once the player was completed the team then moved on to implementing the enemy characters and their interaction with the player.

The team tested the game features and functionality using debugging, playtesting, and unit tests with the Unity test runner. User playtest surveys were also completed by test users to give the team feedback and recommendations regarding future development.

After the core functionality and features of the game were successfully developed and tested, the team then moved on to adding the other features such as puzzles and collectibles. Once the final features were implemented, the team conducted game optimization tasks before finally deploying as an executable.

## CONCLUSION

This project has taught its team members incredibly valuable skills regarding project management, an agile attitude, personal organisation, and game development/design.

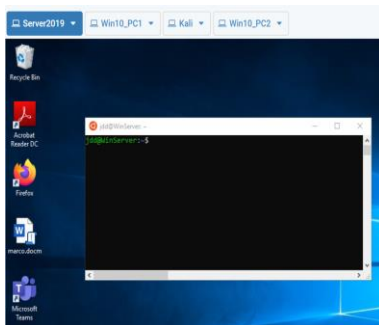
The final product of this project was presented to the client for them to use as a marketing tool to attract new students to the possible accomplishments of studying within WelTec's School of IT, Business and ESOL.

# Active Countermeasures

Team: JingYing Dong, David Gore, Dom Tassadorn

Advisor: Sandeep Vankadari

Client: Paul Bryant



Windows Subsystem For Linux allows Active Countermeasures to run on Windows machine



The test environment topology

id	target	agent	lat	lng	acc	ip	created
1	demo	HTML	38.2534039	-85.7504855	5	12.3.4	2020-05-27 21:08:34
2	demo	HTML	34.855117	-82.114392	1	5.6.7.8	2020-05-27 21:08:34
3	jdd	VB	41.2267	124.9467	Unknown	156.69.33.47	2020-05-27 22:28:39

An example of HoneyBadger finding geolocation of an attacker.

## INTRODUCTION

The *Active Countermeasures* project was about taking standard defensive practices and taking them one step further. Additionally, we were tasked with doing so in a Windows environment, one of our main challenges. Our client was interested in the value of porting many Linux based tools that achieve active defence to a Windows environment to evaluate their worth in this situation.

The project team was also tasked with moving this environment into the 'cloud' for further evaluation. We can show the value of Active Countermeasures as an additional layer of security, and a means of identifying and attributing attackers.

## DEVELOPMENT

The development process of our project followed an agile approach using a visual Kanban style. This was selected for our project as we are taking an iterative approach towards building our environments. This meant that we did a total of four builds, each improving and adding an aspect from the last. Having this Kanban style approach allowed the team to visualize what was going on at any point during the build. This was key in communication and keeping the team on task for the testing phases of the project.

The project team used a free software tool known as Trello to host the Kanban style approach. This was an effective tool and is recommended by the

project team. The testing ranged from simply testing tools functionality, to implementing the testing in a live network. Then we moved on to adding Active Directory and a domain. We moved this whole environment to the 'cloud' for our final build.

The outcome of the project was testing manuals and user guides that the team developed for the environments. However, the primary deliverable was a 'findings report' which was a careful analysis of the tools testing and how they worked on the environment.

## CONCLUSION

The project was a success in the eyes of the project team. While we encountered issues along the way, we followed the necessary processes to achieve a good outcome. We delivered the project findings report on time and completed the project with a good degree of competency. As a result of this, the project team benefited from this project, learning, and understanding more about the current cyber security climate and why it is the way it is.



# Agile Board Tracker

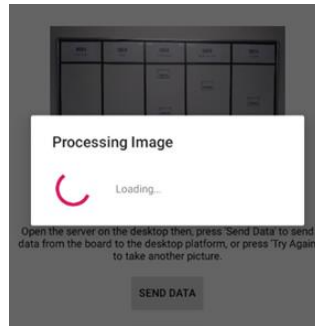
**Team:** Caution Dalley, William Hitchcock and Joseph Holland

**Advisor:** Dr Waqar Khan

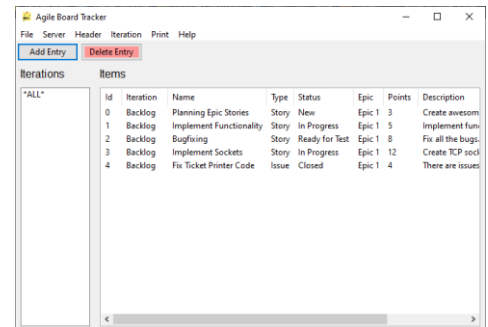
**Client:** Dave Holland



Agile Board



Mobile Application



Desktop Application

## INTRODUCTION

Agile story boards can exist with both physical and digital representations. The synchronisation between the two often serves as unnecessary and unproductive work; time better spent elsewhere. The Agile Board Tracker sought to bridge that gap by providing a quick and easy means of updating the digital, while keeping the physical as the source of truth.

The Agile Board Tracker is a mobile and desktop application designed to capture the changes made on a physical board and update a database. The desktop application contains the ability to create and manage user stories and produce labels, which populate the physical board. When changes are made on the board, the user captures an image with the mobile application, the changes processed and sent to the desktop where the database is updated.

## DEVELOPMENT

The team began with a meeting with the client. The client demonstrated the process to the team and introduced them to the problem domain. From here, requirements were gathered, which enabled the team to develop a picture of how the system will potentially work.

From here, the team engaged with the system analysis and design process to understand the infrastructure of the system, and how the various subsystems, mobile, desktop, and database, would interact with each other. This part also consisted of research to establish the tools and techniques that were needed.

The team used Agile Scrum to develop the system. The development was organised into one-week sprints, which consisted in total of ten sprints. Two members of the team worked on image processing, barcode recognition, and the mobile application, whilst the third member worked on the desktop application, database, and socket data transfer.

Testing was performed using a variety of automated unit, integration, GUI, and system testing. User acceptance testing was performed throughout the project, with frequent client meetings to ensure the product was on the right track.

In the late stages of development, various user manuals and design documentation were produced. A final client meeting and interactive demonstration saw the client personally operating the product.

## CONCLUSION

The project was completed on time, and the minimum viable product was met. The client was pleased with the results produced, even returning during the demonstration to have another go.

This project was a difficult and complex effort, highlighting the magnitude that goes into development. The team was immensely satisfied with the results achieved and the new skills to bring to future projects.

# CASUAL JOBS

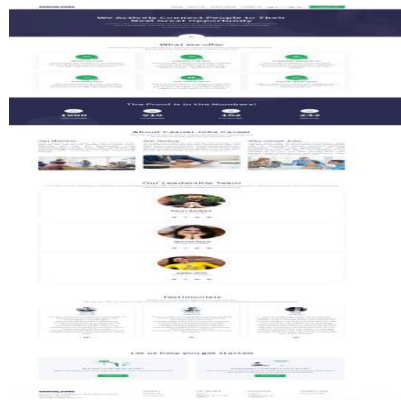
**Team:** Dhruv Dadhich, Shweta Patel, and Anita Jassi

**Client:** Clement Sudhakar Swarnappa

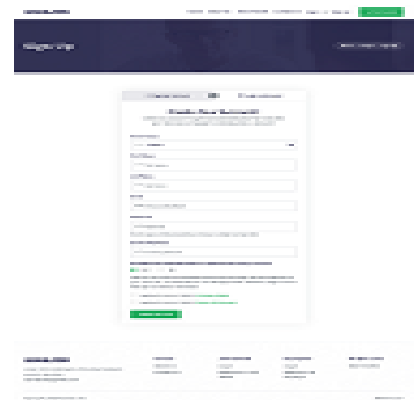
**Advisor:** Nick Tullock



Home Page



About Us



Sign up

## INTRODUCTION

*Casual Jobs* is a responsive web application built for the employer and the candidate and provides an opportunity to bring employers and candidates together. It triggers notifications for the employer and candidate when a right match has been found.

Initially candidates provide details of their skill set, work experience, preferred location, salary expectations and the candidate's availability to start work.

It is the most important aspect for any company to have the right staff with the right skill set as it promotes company growth and achievement of set targets. Job seeking portals are usually the first point of interaction to hire staff.

## DEVELOPMENT

We decided to develop a web application that has a different approach to posting jobs as compared to conventional job posting websites.

A set of multiple questionnaires are the core of the application which enables the employer to populate questionnaires after a candidate's successful registration. The questionnaire helps the employer to populate these in no time, it also helps to have a very strong database where the algorithms are designed to find the right matches.

We have used *Open Up* methodology for this project. The product is developed in an iterative manner starting from preparation of project proposal, product design, development, testing and ends with product monitoring and deployment.

After obtaining approval for the design, the team started the development of a web application in the PHP Laravel platform. This allowed the team to customise the design from a client perspective. We

have installed the XAMPP server and used its in-built MySQL database environment for working in a local server with Visual Studio Code Text Editor as our code editor.

The web application is developed with features of: content management system, responsive search engine optimization, employer and job seeker registration page, login page, job posting features for employer and admin privileges in the website.

The functional testing was carried out by the testing team.

A round of integration testing was done after finishing the functional/system testing.

Regression testing was carried out after each iteration to make sure the existing modules and functionality did not break after the development/testing iterations.

User acceptance testing was done once the web application was completed.

## CONCLUSION

Our team could deliver a quality web application '*Casual Jobs*' for our client with a satisfactory output.

We have gained real time project experience and improved our technical skill set and project management abilities.

We have learned how to work in the agile world which can rapidly change the development and the iterations of the development.



# Casual Jobs Database V.1

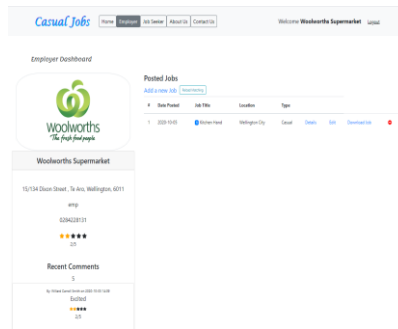
**Team:** Supun Chandra Malimage, Kalaivani Ilango and Ruban Ravi Sebastian

**Advisor:** Dr Steve McKinlay

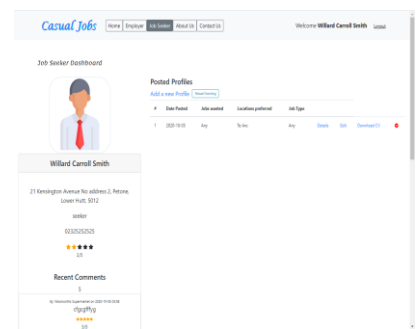
**Client:** Clement Sudhakar Swarnappa



Home page: Casual Jobs Database V.1



Employer Dashboard



Seeker Dashboard

## INTRODUCTION

This is Casual Jobs Database V.1 web application project. The audience for this project is WelTec academic staff member Clement Sudhakar Swarnappa and the SKR team. Most of the international students are facing difficulties in finding casual employment. This project aims at developing a unique job matching algorithm for employers and job seekers to reduce their time on matching profiles.

This system helps employers to sort candidate profiles in matching percentage weight. The developed system uses a requirement specific keyboard free wizard to automate the job matching. Once the employer shortlist a candidate, the respected job seeker can download the pdf format of job advertisement to know more about the job, as well as employer can see seeker's CV before shortlist a candidate.

## DEVELOPMENT

- The methodology we used in this project was Rapid Application Development. We obtained the clients' written approval for each major milestone and continued with 100% clients' satisfaction.
- We started with research to gather information about the job search applications.
- Created a questionnaire and wireframe to start with front-end development. Parallely prepared use case, class activity and ER diagram to develop the database design.

- Developed the job matching algorithm which calculates the weightage between Employer and Job seeker
- Testing has been done in each cycle to make sure the software development is on the right track.
- We have successfully finalized the project 15 days earlier to the expected date and handed over to the client with all the required documents including testing, admin manual and user manual.

## CONCLUSION

As a team we did our work as best as possible to complete this project by the expected deadline also with the expected quality. As expected, we were able complete the project before the deadline by conserving the highest quality, sustainability, and the reliability. The client was 100% satisfied with all the expected deliverables.

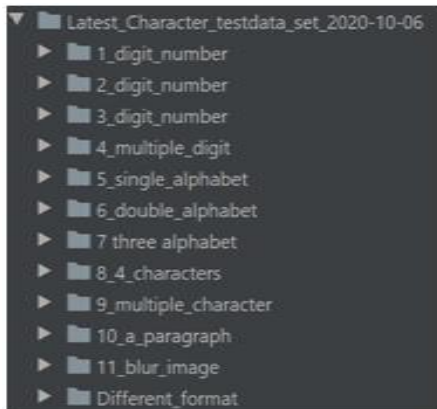
We, SKR team, successfully finalized this project with our teams' unconditional collaboration and dedication. We appreciate our advisor as well as the client for their kind and remarkable support on solving issues during the project.

# Character Recognition in a Digital Image

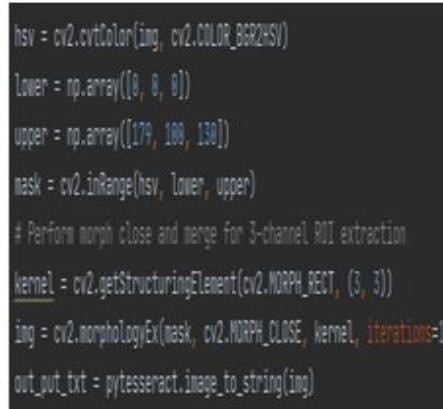
Team: Jiayun Feng, Chanpreet Singh and Kartik Watts

Advisor: Dr Dax Roberts

Client: Dr Waqar khan



There are 12 categories on test data



The main process to handle the data



Pre-processing of the pictures

## INTRODUCTION

The '*Character Recognition in a Digital Image*' is software that recognises the characters from the digital image and converts them into editable and searchable data. The aim of developing *Character Recognition in a Digital Image* software is to save Wellington Institute of Technology (WelTec) students time in converting material from hardcopy to softcopy. The user needs to upload the image document where the content of the image will be displayed in a digitalized editable format.

Storing of information using traditional hardcopy methods, such as books is moving towards digital platforms. There are vast volumes of data not digitalized yet, which students generally struggle to convert printed resources to digital resources. With our software, students can overcome the problem and save a lot of time.

## DEVELOPMENT

At the beginning part of the project, we obtain the client's requirements. We used Python, OpenCV, CNN to make this *Optical Character Recognition* (OCR) software. Our team know how to programme using Python though found it a challenge to learn OpenCV and CNN for the project. A lot of time was spent at the beginning of the project learning OpenCV and CNN.

We read the image data with OpenCV. It took some time to collect the data because it was important to satisfy the requirements for CCN. We focussed on the number of characters as recognizing numbers was easier than letters.

After we finished training number-recognition with CNN, we performed a successful test.

We try to train the alphabet recognizing CNN and soon realised that a lot of data had to be collected. We followed the suggestion of our client to use existing 'pre-trained CNN' which recognised all the alphabet in the image. This was a good move as there are several good pre-trained CNN on the internet.

We researched different types of pre-trained CNN and after testing we used Tesseract which had a 'Long Short-Term Memory' (LSTM) CNN provided as an open source by Google. To use this pre-trained CNN, we need to pre-process the image before feeding it to LSTM CNN.

After working out the pre-processing part, we started collecting data from real-life with our phone to test the whole OCR system. We created some test cases on different conditions such as zoom in or zoom out and taking pictures from a different angle (75°, 90°, and 120°). We achieved a success rate of 85%. If the user takes the pictures in zoom-in mode and 90 degrees, the success rate will be much higher. Testing showed us that the software was now ready to be deployed.

## CONCLUSION

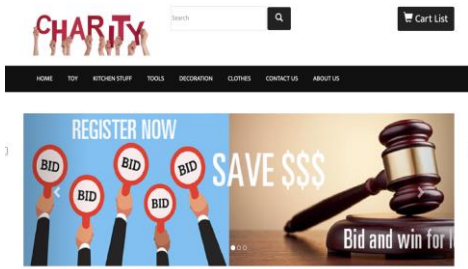
The *Character Recognition in a Digital Image* software recognizes characters in most conditions and will provide students at Weltec the opportunity to convert their printed resources into digital resources.

# Charity Second-hand Online Store

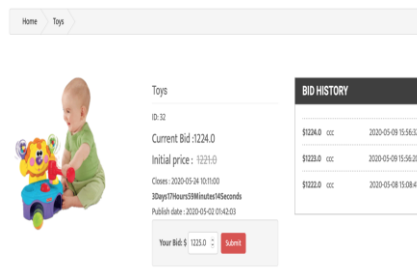
Team: Guozhi Yin and Cong Shang

Advisor: Ian Hunter

Client: Zoe Liu



Home page



Auction page



Order page

## INTRODUCTION

The purpose of this project is to create a website for second-hand charity stores to help them improve transaction efficiency and increase turnover and income.

In this way, the information construction of these stores can be improved to better promote the development of community services.

There are two members in our team (Guozhi Yin, Cong Shang). Guozhi Yin was responsible for product design, project management, database testing and documentation. Cong Shang was responsible for the development, testing and documentation.

## DEVELOPMENT

The project team investigated and collected requirements from the client. The methodology which was chosen by the project team is prototyping. Using this method, the client can intuitively understand the functional design of the product and reduce the deviation in the demand communication.

The project team used Microsoft Project to manage the entire project process. From the beginning of the planning phase, a clear set of objectives were identified for each phase of the output, as well as the tasks and responsibilities of each member.

The project team transformed the requirements into the functions of the product and carried out product design. A total of 14 functional modules were designed. After confirming the product function with the client, the project team carried out

system analysis and design, test plan and test case design.

In this project, the project team used Eclipse as the development tool and the technical architecture selected was JSP + SERVLET which is stable and easy to use. The team choose MYSQL as the database.

To improve the efficiency and stability of data connection, the team used DBCP as the database connection tool. The version management tool uses GIT. With the development process, the code is constantly uploaded to GitHub. The project cost and all development tools were obtained at no cost.

After development, the project team conducted integration testing, system testing, and user acceptance testing of the system. All defects and bugs found in the tests were fixed.

## CONCLUSION

After completing five milestones, the system met all the requirements requested by the client. The project team has completed the client's training and the delivery of relevant documents, and received the client's receipt and confirmation email, meaning that the project can be completed successfully.

Through this project, the project team learned experience in risk management, time management, teamwork, documentation and technology. These valuable experiences will be of great help to any future projects we may be involved in.



# Choosing the best forecasting method for the subscription volume of Homes.co.nz

By: Olga Balashova

Advisor: Dr Fahimi Ali

Host Organisation: Homes.co.nz



Olga Balashova



## PROJECT SCOPE

The project focused on finding best forecasting method for subscription volume of Homes.co.nz. This is due to long-term forecasting and short-term quantitative forecasting methods.

The objectives of this project are:

RO1: To identify the best quantitative forecasting method to make more accurate forecasts of the number of premium agents, suburb expert and branch subscriptions.

RO2: To identify the best methodology to summarize historical forecast errors to assess accuracy.

These objectives were guided by the following project research questions:

RQ1: What quantitative forecasting method should be used to make more accurate forecasts of the number of subscriptions?

RQ2: What methodology should be used to summarize historical forecast errors to assess accuracy?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic area includes Analysis of the Internet Impact on the Real Estate Industry, Real estate website business models and Real estate platform.

## PROJECT FINDINGS AND RECOMMENDATIONS

To answer the project research question, a secondary - quantitative method approach was used. The data was collected through in-depth face-to-face interviews.

Data was analysed using statistics of previous transactions.

It was found that based on the results of the calculations, it was revealed that for all three types of subscriptions, the most accurate forecast is obtained by the Weighted Moving Average forecasting method.

The findings are expected where it is like the literature.

Based on the evidence found from the findings, it was recommended that in short-term, the host might use the weighted moving average forecasting methodology as the most accurate methodology for predicting the future number of subscriptions.

In long term, Homes.co.nz may creating a small software product for calculating trends and forecasts for sales of company services.

## CONCLUSION

In conclusion, this project recommended three number of short-term and one long-term recommendations based on the evidence found through a secondary quantitative data collection method.

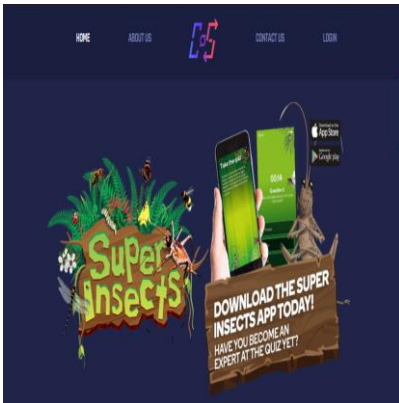
The recommendations have helped Homes.co.nz to choose methods for forecasting subscription volume and to guide them to plan for their business direction in future.

# Collection Swap

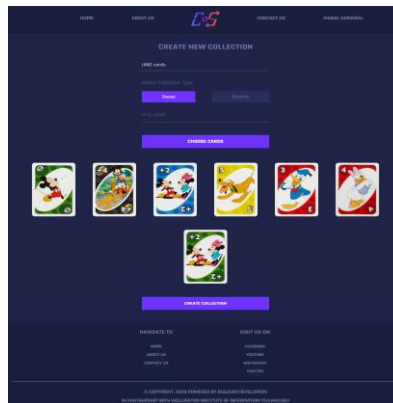
**Team:** Manal Agrawal and Dhruvit Navadiya

**Advisor:** Dr Trang Do

**Client:** Robert Sutcliffe



Home Page



User Collection Page



Admin Dashboard

## INTRODUCTION

Our client discovered a concept regarding the swapping of cards. He wishes to have a system where he can swap collection cards available at supermarkets such as Countdown, New World, and Pak'nSav. These items are available during the promotion of different products such as the Weetbix cereal. However, with many collectables in each collection, it is not easy to collect the complete set.

With a growing industry of collectable items with various products, New Zealand's supermarkets provide many options for all.

With this opportunity, BugZero Developers proposes developing a web system, named *Collect'NSwap*, to support users to swap collected items without paying any money. This will be a system where young children can trade cards available at supermarkets. This system will be a goodwill exchange website where children trade within a safe website environment and with parental supervision with others via NZ post. This will be a one to one swapping system.

## DEVELOPMENT

There are six steps required to develop a system like Collect'NSwap.

1. First, we gathered all the information regarding the cards that were available on the internet or in the documents provided by the client. We made sure that we were on the same page as the client and had understood his brief correctly.
2. After we gathered all the information, we made a plan and set up the tools that we were going to use to develop the website. We also decided on the

methodology to be used for the project. With the methodology, we also decided what technology we are going to use to develop the website.

3. At the design phase we produced the design documents to show to the client. We created the wireframe that showed how our website would look.
4. At the development stage we created the website according to the design that we made in the earlier stage. It took us time to do that, and quickly followed was the rapid development phase. This was where we developed the main functionalities then lastly developed the static pages like Homepage, About Us, and Contact Us pages.
5. For the testing phase we used manual testing where the test cases were developed first and then tested. A test report was produced from the findings.
6. In the maintenance phase, we worked on the test cases that failed to pass in the test phase and made finishing touches to the design.

## CONCLUSION

With a Goodwill exchange website, it would be great for NZ children and their families to enjoy the swapping of cards through our website in a safe and healthy environment.

It is an excellent opportunity for us to share what we have attained in terms of skill and knowledge in producing the Collect'NSwap website.

# COVID-19 public gathering requirements and Lockdown restrictions

By: Holly Whitney

Advisor: Dr Fahimi Ali

Organisation: Wellington, NZ



Holly Whitney



Wellington, NZ

## PROJECT SCOPE

The project focuses on identifying the potential issues COVID19 public gatherings have made both in and coming out of Level 2 Lockdown restrictions for Wellington, NZ. This is due to the researcher having an interest in this ongoing current topic that is constantly changing during 2020.

The objective of this project is:

RO1: To identify some potential issues regarding the COVID19 public gathering requirements both in and coming out of Level 2 Lockdown restrictions

This objective was guided by the following project research question:

RQ1: What are some potential issues regarding the COVID19 public gathering requirements both in and coming out of Level 2 Lockdown restrictions.

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic areas included event planning, event security and event safety.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research question, a quantitative and secondary approach was used. The data was collected through conducting in-depth face to face interviews as well as peer-reviewed articles were analysed.

It was found that the restrictions that sat underneath both Level 1 and Level 2 continued to change as the government continued to alter the Alert Level criteria. Wellington, NZ played an integral role in investigating what could be done to help the city of Wellington recover financially. Wellington, NZ then confirmed an investment in the event *Digital Nights Van Gogh Alive*.

The findings were unexpected and differed from the literature, largely to do with COVID-19 being such a current, unknown event.

Based on the evidence found from the findings, it was recommended that if Level 2 Lockdown restrictions were to occur again the host should stay in connection with its partners more frequently while looking into the realm of online events.

## CONCLUSION

In conclusion this project recommended two main recommendations based on the evidence found through a quantitative and secondary data collection methods.

The recommendations have helped Wellington, NZ in some way to solve their issues and to guide them to plan for their business direction in the future.

# COVID-19 Tracker Dashboard

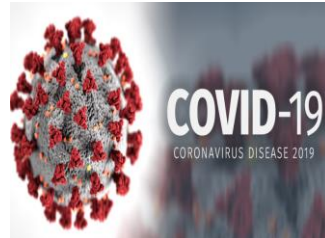
Team: Falcon (Amarpreet Singh and Harmandeep Singh)

Advisor: Dr Trang Do

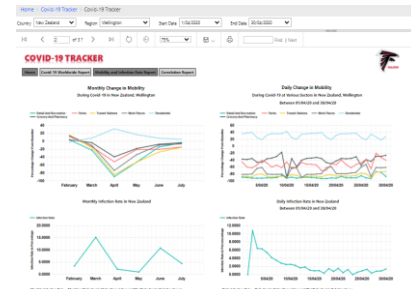
Client: Trung Nguyen



1 Home Page of Covid-19 Tracker



2 Covid-19 Virus



3 Dashboard displaying change in mobility and infection rate

## INTRODUCTION

The *COVID-19 Tracker* is a dashboard representing the COVID-19 worldwide impact along with monthly and daily infection rates and change in mobility in different regions of a country due to lockdown and the correlation between them. The *COVID-19 Tracker* includes deep analysis of countries having a population over 100 million and over 0.2 million Covid-19 confirmed cases. This is currently the case in India, Brazil, and Mexico. It also includes New Zealand. Deep Analysis of change in mobility is done region wise for these four countries.

COVID-19 has badly impacted economies worldwide. There is research going on worldwide to determine the influence of Covid-19 on various sectors so that pre-planned measures can be taken to minimise the impact of similar pandemics in the future. The audience for this project is wide and aimed at the public, government and other organisations with a vested interest in the impact of COVID-19.

## DEVELOPMENT

The main goal of this project was to visualise the impact of COVID-19. The team started by collecting and understanding the client's requirements. The team planned for the activities required to complete this project successfully.

For the design phase our team researched to understand exactly what our client wanted. Our project advisor and the client were supportive and explained their requirements in detail.

Research was carried out to gather data from different sources. The system analysis and design documents including user stories, diagrams,

prototypes, wireframes, etc. were developed to have an idea of the reporting system required for the project.

The methodology chosen was SCRUM. We decided to work in three sprints. Each sprint included database designing, coding, dashboard designing and testing. In the middle of the project, team had to go through a change control. The team added another sprint in the project to meet the client's requirements.

Manual testing was carried out as per IEEE 829 format. Regression testing was done after each sprint, to ensure the quality of the product. User Acceptance Testing was also carried out at the end with the client's permission.

After finishing all the sprints, our team prepared the product manual and documents for the client handover. All the necessary documents for academic handover were prepared after the client handover. Our team faced some issues during the project which we were able to overcome and we were able to meet our client's expectations.

## CONCLUSION

Our client was happy with our team performance as when we were faced with an issue, we went through the change control process to maintain the quality of the product.

As a team, we have gained experience and respect for each other's strengths. Having a working product and being able to work through problems that we faced in developing the COVID-19 Tracker Dashboard will be helpful to us when working in the IT industry soon.



# Customer Retention Strategies for Brendan Foot

By: Louie Labett

Advisor: Dr Fahimi Ali

Host Organisation: Brendan Foot Supersite



## PROJECT SCOPE

The project focused on customer retention strategies for Brendan Foot Supersite. This is due to the Holden brand retiring and Holden vehicles accounting for a significant part of new car sales.

The objectives of this project are:

RO1: To identify strategies Brendan Foot can use to retain its Holden customers

RO2: To evaluate and select the best strategy for Brendan Foot to adopt.

These objectives were guided by the following project research questions:

RQ1: How loyal are people to car dealerships?

RQ2: What are the factors that have the most influence on new car purchases?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic areas include customer loyalty for large purchases, buyer decision making, the importance of after-sale relationships and perceptions of customer service.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research questions, a primary quantitative and secondary qualitative and qualitative data approach was used. The primary data was collected through 254 respondents. Data was analysed using Excel.

It was found that only 54% of people say vehicle brand is very important. Over 80% of people say knowledgeable staff, price, and clean cars are very important.

The findings are expected, where it is similar to the literature review.

Based on the evidence found from the findings, it was recommended that in the short-term, the host can prioritise the training of salespeople to be knowledgeable and friendly towards customers. Then focus on retaining these employees.

In long term, Brendan Foot may implement the recommendation of raising awareness of their competitive prices, especially with people who do not use a dealership.

## CONCLUSION

In conclusion, this project recommended two short-term and one long-term recommendation, based on the evidence found through the quantitative data collected from primary research.

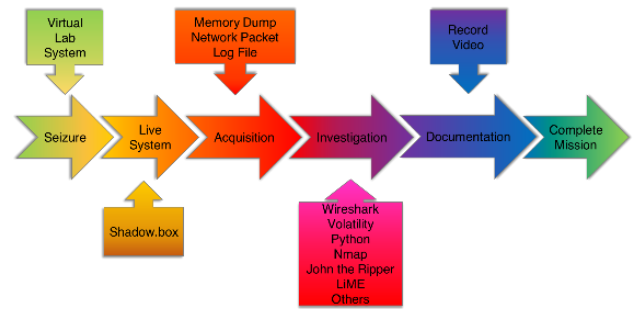
The recommendations have helped Brendan Foot in some way to solve their potential issue with retaining Holden customers and to guide them to plan for their business direction in future.

# Digital Corpora

Team: Yu Gao, Jun Lu and Minchen Ye

Advisor: Dr Dax Roberts

Client: Paul Bryant



## INTRODUCTION

Digital corpora is the educational and research field of digital forensics. In digital forensics education, it is important to provide insights into specific technologies and how forensics can be used for thorough and sophisticated analysis. It is also important to provide a rich learning environment where students can use forensic tools to rigorously analyse appropriate test data.

This project is based on the knowledge learned to build a virtual environment to simulate a real hacking process. These activities include the whole process of hackers sniffing, attack the server, privilege escalation, obtaining confidential information, and then leaving by the back door.

## DEVELOPMENT

- ♦ Environment setup: Build a virtual environment.
- ♦ Simulated attack: Reproduce the attack process.
- ♦ Collect and examine evidence: Students must collect relevant data and confirm the validity of the data.
- ♦ Analysis: The data collected is used to prove (or disprove) the case that the examiner is establishing. For each relevant data item, the

examiner needs to try to determine its relationship with the case.

- ♦ Reporting: Data and analysis will be synthesized in this process into a form that can be understood by laymen. Being able to create such reports is definitely a crucial skill for examiner.

## CONCLUSION

Digital forensic investigators must have extensive knowledge of forensic methodologies and experience with a variety of tools. This includes multi-purpose forensic kits with advanced features and good availability, as well as gadgets for special tasks that may have medium to low availability. In addition, advances in analytical methods, tools, and techniques require constant learning to remain generic.

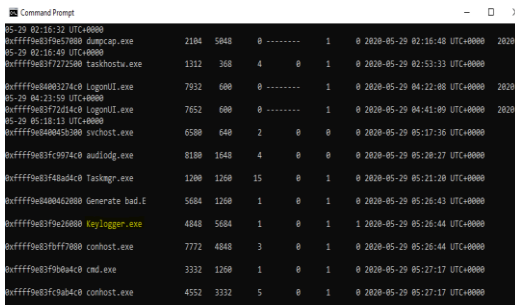
SouthPark hope that students can combine these fragmented tools and software in this project, and finally finish a report independently. SouthPark want the students to be able to protect the assets of businesses and organisations from cybercrime when they graduate, and even to help the police with such problems in the future.

# Digital Corpora 2

**Team:** Minh Dang, Jacky Chen, Ben Paorik, and Sam Lee

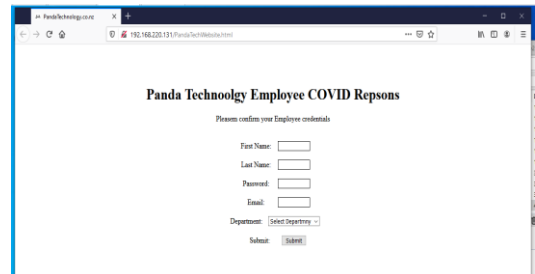
**Advisor:** Dr Dax Roberts

**Client:** Paul Bryant



Process Name	PID	PPID	Session ID	Architecture	Company Name	Product Name	Version	Start Time	End Time
dumpcap.exe	2184	5808	0	-----	1	0	2020-05-29 02:16:48 UTC+0000	2020-05-29 02:16:49 UTC+0000	
taskhostw.exe	1312	368	4	0	1	0	2020-05-29 02:53:33 UTC+0000	2020-05-29 04:23:59 UTC+0000	
LogonUI.exe	7532	680	0	-----	1	0	2020-05-29 04:22:08 UTC+0000	2020-05-29 04:23:59 UTC+0000	
LogonUI.exe	7652	680	0	-----	1	0	2020-05-29 04:41:09 UTC+0000	2020-05-29 05:12:13 UTC+0000	
svchost.exe	6588	648	2	0	0	0	2020-05-29 05:17:36 UTC+0000	2020-05-29 05:20:27 UTC+0000	
audiodg.exe	8188	1648	4	0	0	0	2020-05-29 05:20:27 UTC+0000	2020-05-29 05:21:28 UTC+0000	
Taskmgr.exe	1288	1288	15	0	1	0	2020-05-29 05:21:28 UTC+0000	2020-05-29 05:26:44 UTC+0000	
Generate bad.E	5884	1288	1	0	1	0	2020-05-29 05:26:44 UTC+0000	2020-05-29 05:26:44 UTC+0000	
Keylogger.exe	4848	5884	1	0	1	1	2020-05-29 05:26:44 UTC+0000	2020-05-29 05:27:17 UTC+0000	
conhost.exe	7772	4848	3	0	1	0	2020-05-29 05:27:17 UTC+0000	2020-05-29 05:27:17 UTC+0000	
cmd.exe	3332	1288	1	0	1	0	2020-05-29 05:27:17 UTC+0000	2020-05-29 05:27:17 UTC+0000	
conhost.exe	4552	3332	5	0	1	0	2020-05-29 05:27:17 UTC+0000	2020-05-29 05:27:17 UTC+0000	

Keylogger Found



Phishing Website

## INTRODUCTION

Welcome to project, Digital Corpora 2. The goal was to create learning materials suitable for the education of future WelTec students. Our corpora containing items such as: disk images, memory dumps, network packet captures and scenarios which students will work through and hopefully learn a thing or two.

The topic we have based our learning materials on is that of 'phishing'. It is a topic that we believe interests many IT students as they should have encountered or at least of heard of the term before. The learning materials consist of developing a phishing attack, seeing how it works, and then obtaining the phished details in a text file. They will then analyse the attack and record their findings. We hope this will educate students about phishing as our aim is to help them get comfortable with industry-standard tools.

## DEVELOPMENT

The development cycle of this project was run through a Waterfall development approach. Technical development was done using VMware Workstation Pro to run and develop our VMs. This would also serve as the place the project scenarios would run. The environment is Windows 10 based with a Windows Server 2012 R2 acting as an email server for the phishing attack. Some notable tools incorporated include, Wireshark, Volatility Framework and Autopsy. Each tool serves a purpose in both scenarios one and two. Through the development process, we hit early issues

around COVID-19 as all teams did. This meant that our homes became our workplaces which we were forced to adapt to.

Our first technical issue was configuring our local email connectivity but soon resolved that and proceeded through the workload faster than anticipated. This resulted in us creating a second scenario further developing on the skills taught in scenario 1.

Our client expressed his interest in having the learning materials be suitable for Level 6 Information Technology students, this meant we had to look at tools we knew they would have experience with and build upon that. As well as incorporating industry toolchains, we believe that experience with these toolchains is beneficial to a student's learning and can provide them with an edge when they enter the industry.

## CONCLUSION

In the end our project achieved its goal of creating learning materials suitable for level 6 students.

We believe that we achieved what the client had tasked us with at the beginning of the project.

In the end we produced two scenarios:

1. One about email phishing and
2. the second but more importantly as a development team we have come out of this experience with a greater understanding of working within a cohesive team dynamic and being proud of the work that we were producing.

# Drunken Panda

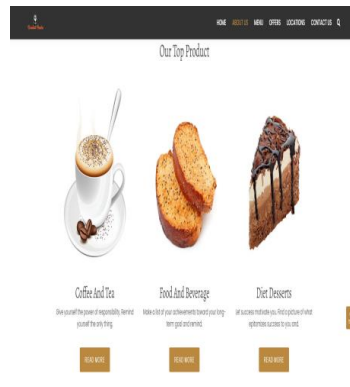
**Team:** Athul Krishna Sajeevan, Dhanvin Thomas, and Hussain Dholkawala

**Advisor:** Dr Hamid Mahroeian

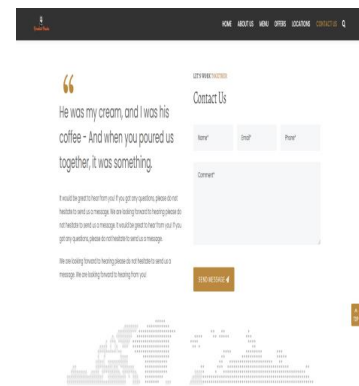
**Client:** Deepak Trosky



Home page



About us page



Contact Page

## INTRODUCTION

The aim of the project is to firstly, create a website for Drunken Panda. The page we created is an official website. This website will provide the information about the Drunken Panda café's background, menus, locations etc. This is our front end for the project.

During our first meeting the client stated he wanted us to add a social media advertisement for the website. This has been added to the last part of our iteration. The client also wanted the option for online ordering.

## DEVELOPMENT

The project was to create a website for a café based in Kerala, India. The requirement from the client included a home page for the website which included the brief description of the café, navigation bar, existing products, promotions, and locations of the stores across Kerala, India.

The top navigation included Home, About Us, Menu, Offers, Locations, and Contact us. There was also search option available in the website.

## CONCLUSION

Update Menu.

Provide location with google maps.

Functional prototype.

Our team enjoyed undertaking this project and we have learned a lot from improving our communication skills and ensuring we were able to complete tasks on time for the Drunken Panda Café.



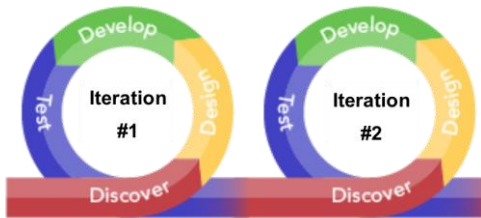


# Friends of Pātaka v3

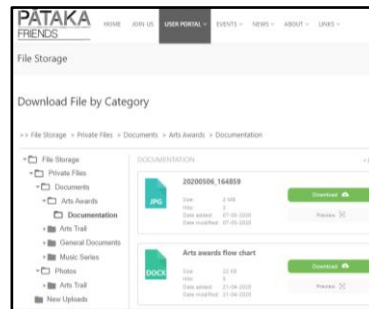
**Team:** Andrew Russell, Jack Walter, and Savelina Tautua'a

**Advisor:** Sue Scott

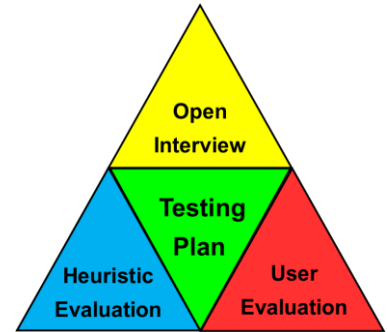
**Client:** Sue Mortlock



Agile iterations used (Source: thinkinc.com)



CMS Front-end: Download File View



Our triangulated testing plan

## INTRODUCTION

Pātaka is a globally renowned art museum. The client for this project is Sue Mortlock on behalf of the Friends of Pātaka community volunteer group.

The goal of this project was to build a suitable and user-friendly content management system (CMS) to address the shortcomings of the client's paper-based file system.

The Friends of Pātaka committee has the need to store important documents and photos in a central, accessible location. Additionally, the client needs an online communications medium where anyone can join as a member and register for events.

## DEVELOPMENT

The CMS was developed using the Agile Scrum methodology in two iterations. The project team utilised a client-focused approach, meeting regularly with the client and consulting with the client before installing plugins and changing the site layout or content.

Initially the client had a general idea of what they wanted but no specific requirements. We took a user-centred approach and communicated the possibilities of the CMS to the client. We also worked with them to gather and analyse requirements, as well as identify and categorise the types of documents to be managed.

We decided WordPress was the most appropriate CMS software for the client's needs because of its flexibility and extensibility. We designed a detailed sitemap, produced wireframes and functional iterative prototypes in WordPress.

Additionally, we researched and installed plugins for an events calendar, user roles, forms, and file storage. We chose the WP File Download plugin because of its simplicity and fluidness.

Furthermore, we designed and executed triangulated test plans including an expert heuristic evaluation, as well as user testing with a walkthrough and an open interview.

We managed to work remotely during the COVID-19 lockdown and continued to hold meetings via Zoom and complete the project despite these limitations.

## CONCLUSION

All iterations stated in the Project Proposal were successfully completed. The CMS is almost complete and requires some finishing touches.

The users have found the CMS easy and enjoyable to use and have flexibility when using it.

We have handed over detailed feedback and recommendations for future development. The next project team could incorporate security and encryption, conduct further testing and add more visual design elements to the interface. Finally, the translation plugin's accuracy could be tested, and the Māori language translation should adhere to the Treaty of Waitangi principles of partnership, participation and protection.

# Friends of Pātaka

**Team:** Kimi Wang, Eddie Huang, An Liu

**Advisor:** Susan Scott

**Client:** Sue Mortlock

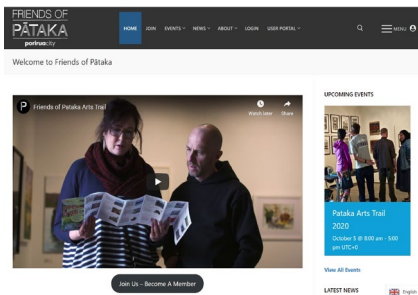
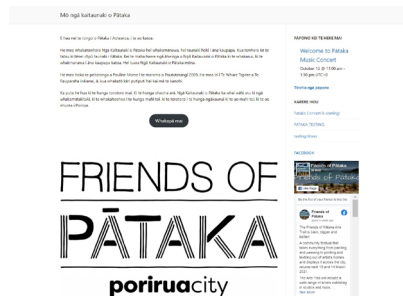
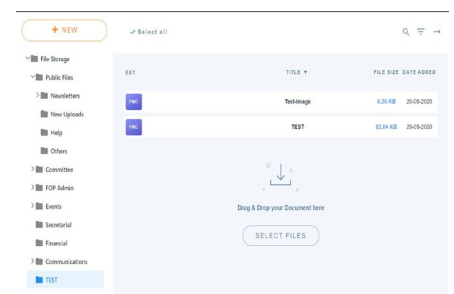


Image of the application



Maori language interface



Content management system

## INTRODUCTION

The Friends of Pātaka project is a content management system (CMS) that came to us highly developed by two previous teams. Our aim was to complete and refine the application. Requirements included UI optimization, Māori language consultation and translation, security enhancement, 'help' section visualization, and CMS optimization.

## DEVELOPMENT

This project continues to build a secure website consisting of content management system for members of the Pātaka Art + Museum. On this website members can apply to join as a member, view events and news; administrators can log into the system to manage their documents in CMS.

The team used an Agile methodology. Project team held several multi-party meetings with clients, course advisor, security advisor, and Māori language advisor to discuss project requirements, scope, problems and solutions. Weekly group meetings were also held to track the project progress.

The project team underwent substantial research relating to WordPress, human computer interaction, server options, payment tools, security enhancement, and Māori language. After in-depth discussions with clients and advisors, the project team put forward many suggestions, tests and requirements decisions. The team then made a large number of improvements on the user interface, CMS, web translation, user roles and security.

## CONCLUSION

Understanding the processes the previous team had been through was a major task in itself. However, our team has successfully continued with the UI layout design and adjustment, user permission level setting, CMS adjustment, research on server options, Māori language consultation and translations. The enhancement of security is the final task.

# GovtSoft - Certification and Accreditation

**Team:** Chris Vailalo, Andy Dahya, Dominique Auer

**Advisor:** Glenda Shaw

**Client:** Clientless

Task	Responsible	Completed?	Date
System Architecture and Design Document submission	System Owner	✓	14/12/2019
Risk qualification questionnaire submission	System Owner	✓	17/12/2019
Risk assessment submission	Assessor	✓	21/12/2019
Risk assessment approval	Certification Authority	✓	04/01/2020
Test documentation submission	System Owner	✓	10/01/2020
Audit scope submission	Assessor		
Initial audit report submission	Assessor		
Recommended controls implemented	System Owner		
Controls implementation audit report submission	Assessor		
Final Report	Assessor		
Final Report and Residual Risk acceptance	Certification Authority		
Final Report and Residual Risk acceptance	Accreditation Authority		



Homepage - Solution 2

Project progress table - Solution 1

## INTRODUCTION

Certification and Accreditation (C&A) is the process that all New Zealand government departments must follow when implementing a new IT system. The goal of this project was to develop a web-based application that tracked and monitored the C&A process. As far as we know, there is no software application currently used by New Zealand government departments to track and monitor the process.

Our project manager, Chris, interned at a government department last summer and learned that the C&A process was conducted manually and that there was no system that helped track or monitor the process. There was a lot of paperwork and no central repository for all C&A participants to access associated files, no single channel for participants to communicate with each other, and inconsistent C&A assessments, just to name a few.

## DEVELOPMENT

During the analysis and design phase, our team focused on identifying what steps in the C&A process each participant was responsible for. The participants (System Owner, Assessor, Certification Authority, and Accreditation Authority) are responsible for different tasks. The System Owner and Assessor are responsible for the majority of the tasks within the C&A process, whereas the Certification Authority and Accreditation Authority are responsible for reviewing the findings and making an informed decision.

It was imperative that we understood how each task linked with the next task and the previous. Halfway into the project, it was decided that the development be 'forked', enabling the team to create essentially two solutions. Both solutions remain incomplete.

The first solution is entirely static. It focussed on developing a C&A project progress table to show where in the process a project is. The second solution had somewhat of a backend with functions such as register user, login, and download and upload files.

## CONCLUSION

Because the development was forked, the focus of what we were initially aiming to complete was split. There were communication issues that prevented the team from being more effective and efficient, however, the forking of the development fortunately allowed the team to work in harmony.

Both solutions are incomplete. Solution 1 lacked a backend. However, it illustrates how a C&A project could be tracked. Further development could see the solution complete.

Solution 2 focussed on some of the initial tasks of the C&A process. However, it does not provide a method to track and monitor a C&A project.

The combination of both solutions could've presented a more complete solution where in our opinion, in hindsight, if we had resolved our communication issues more effectively instead of resorting to the fork in development, we would have accomplished more.

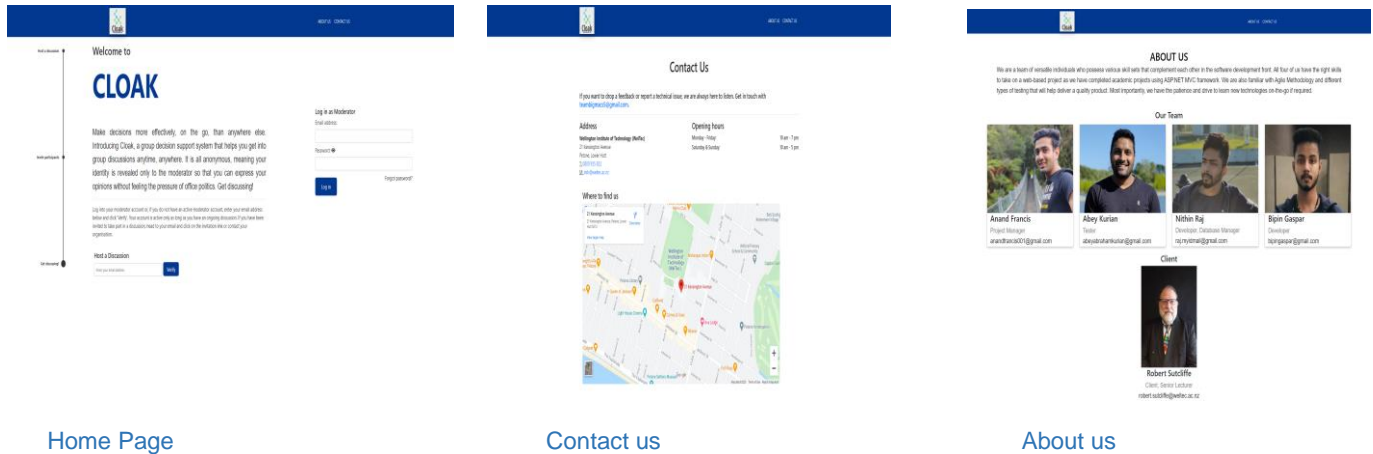


# Group Decision Support Systems

**Team:** Anand Francs, Abey Kurian, Bipin Gaspar and Nithin Raj

**Advisor:** Richa Panjabi

**Client:** Robert Sutcliffe



## INTRODUCTION

Cloak is a group decision support system that helps to host anonymous group discussions. The website is designed to encourage a free flow of thoughts within organisations for effective communication and decision making.

This is achieved by providing anonymity to its users, which in turn would grant them freedom from office politics. A hassle-free, no- signup system makes the application easy to use. Only moderators are required to sign up and only they can view the real identities of participants. The application is also mobile friendly, which makes it suitable for the present world.

## DEVELOPMENT

The development of the *Group Decision Support Systems* project was generated through brainstorming techniques. Agile Scrum methodology was selected so that changes are made when needed. Daily scrum meetings were conducted to ensure the progress in teamwork.

The development process began with gathering of requirements from the client. Thereafter, the design documents were created, and separate diagrams were formulated for each sprint. Moreover, development was conducted as per the needs of the client.

The web application was developed using ASP.NET MVC. Different coding languages were used including HTML, JavaScript, jQuery and CSS.

The database of Cloak was made using Microsoft SQL Server. LINQ was used to query the database from the source code.

The web application was tested in each sprint and was delivered to the client and changes were made as per the client's request.

The team developed the version 1 of Cloak.

## CONCLUSION

Cloak aims to produce better decision making within organisations. As version 1, this project is being completed with basic functionalities, leaving scope for further improvement in future versions.

As COVID-19 has changed the very concept of work environments, applications like Cloak have become more prominent than ever. Hence, if done right, this project holds the scope to compete in the global market.

# Hospitality Venue in Wellington & Response to Covid-19

By: Haosen

Host Organisation: The Fringe Bar

Advisor: Dr Fahimi Ali



By: Haosen



## PROJECT SCOPE

The project focused on the issues of health and safety; staff relationship and resource management; finance and cost perspectives inside set budget; and lastly, challenge and unpredictability of COVID-19.

The researcher is motivated as an employee at the bar to understand and aid the business to find a way forward during COVID-19.

The objective (s) of this project (is/are):

RO1: Carry out empirical research addressing the issue of how the business is to manage COVID-19.

RO2: To design a response and strategy which deals with – better resource management; staff training; consistent and better communication between the business and its stakeholders; better health and safety management; and ultimately generate for the business a sense for its future that is an improvement on its current view of itself.

These objectives were guided by one key research question:

*How can the Fringe Bar manage COVID-19 and map a sustainable future?*

In-depth perspective, current knowledge of the workplace, and literature review was conducted. Some of the topic area includes:

- Pre-Crisis Preparation for SARS 1 (Israeli & Reichel, 2003)
- Crisis situations require disciplined response (Kim et al., 2006; Tse et al., 2005)
- Resilience, discussed as a feature of groups at a Victoria University conference (Rose, 2014)

## PROJECT FINDINGS & RECOMMENDATIONS

Project research used a mixed methodology. Data was collected through survey with stakeholders; face to face interviews, and a weekly observation; lastly, 40 peer-reviewed articles were analysed.

Data was analysed using diagrams provided by business executives.

Significant findings include – the impact of the lockdown for the business was less than initially anticipated.

Business experience matched closely similar hospitality outlets over this time.

Resilience and positivity proved central to the business remaining open.

Th findings are consistent with a portion of the literature review articles, which argued for a positive attitude, including support from government sources.

Based on the findings, three perspectives were offered:

- Short-term - Money saving/cost cutting
- Mid-term – steppingstone (Take-a-way)
- Long-term – Venue change considered; outdoor seating; staff development and knowledge management.

## CONCLUSION

These three recommendations are based on what has been found inside the literature review and participant observation/discussion.

# Infinitybook

Team: Trystan Watson and Codie Lane

Advisor: Trang Do

Client: Robert Sutcliffe



Create stories with up to 10 writers

Take turns writing a storybook from scratch

Use story codes to view stories anytime

## INTRODUCTION

The *Infinitybook* is a Collaborative Storybook writing experience. A supervisor, such as a parent or teacher, will set up a session in which a group of writers (usually young children) take turns writing a book together. Stories written in this website will also have a unique story code that anyone can use to read the story later, so participants may share the stories they wrote with their family or friends.

As the story is written, the program will display different backgrounds and characters depending on the wording used e.g. 'space' can change the background to a starry galaxy. This is intended to give a dynamic and engaging experience to young writers, to give them an interest in reading and writing, as well as functioning as a team building exercise.

## DEVELOPMENT

The *Infinitybook* was developed over four separate development cycles, each with a project deliverable as the objective. Before these development cycles, a project proposal was created and signed by the team and client, and the project team then continued into a planning phase before development could begin.

The planning phase of the project included the creation of several design documents, including a Wireframe, Storyboard, UML diagrams, Sequence diagrams, Use cases, Activity diagrams, and a Gantt chart. These diagrams would later be used as a guideline to the project development.

The project was developed using Agile methodology including a Kanban board. Each phase of the project would take place over one to two weeks with a clear goal in mind – usually a specific deliverable to present to the client.

The Kanban board consisted of 'to do', 'doing' and 'done' tasks within the project, each with due dates and an assigned team member. This board is constantly updated during the project lifecycle, with new tasks being added and older tasks being shifted as they are addressed or completed.

The goals of each development cycle, in order, was a Prototype, Alpha, Minimum Viable Product, and Completed Version 1 version of the final product to be given to the client. The final handover is called Version 1 as some features discussed with the client would not be incorporated in this version but may be added later onto the product to create future versions.

Each development cycle also included testing to determine what of the agreed features (from the project proposal) had been completed so far, and regression testing for previously completed features. The later phases were tested using Whitebox, Blackbox, Exploratory, Usability and automatic security tests to minimize risks and defects.

## CONCLUSION

The final handover for the client includes the product The *Infinitybook* website, a Test Report document, instructions to maintain and further develop the website, any recommendations and recorded ideas for future development, and finally a client evaluation sheet for the client to rate our product and service.

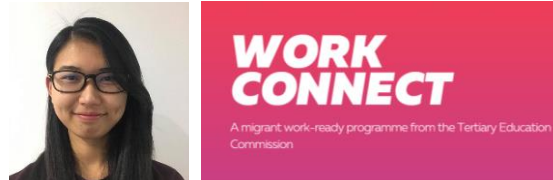
For this project, the team prioritized completing every agreed requirement from the project proposal. While these were all addressed to some degree, some features, details, and suggestions made during client discussions were not implemented due to time constraints. The final product should still be satisfactory for the client, and we as a team are happy with our outcome. Given more time, we believe we could have further exceeded the client's expectations.

# Integrating Employees' Knowledge and Experience to Work Connect

By: Sokuntheary Thong

Advisor: Dr Fahimi Ali

Host Organisation: Work Connect



Sokuntheary Thong

## PROJECT SCOPE

The project focused on the opportunity for the Work Connect to strengthen its human resource capabilities and continuously improve its workshops. This is due to the Work Connect national manager's motivation that he would like to ensure all his clients' needs are fulfilled.

The objectives of this project are:

RO1: to investigate how Work Connect can integrate the employees' knowledge and experiences through the practice of knowledge management (KM).

RO2: to examine the benefits that Work Connect may receive from undertaking the KM practice.

These objectives were guided by the following project research question:

RQ: How integrating employees' knowledge and experience can add values to the Work Connect?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic areas included the KM process, KM tools, creating a knowledge sharing culture, and the current trends in KM.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research question, a mixed method approach was used. The data was collected through an in-depth face-to-face interview and a global survey of knowledge management conducted by Knoco.

Data was analysed using charts, graphs, and themes.

It was found that most of the participants successfully implemented KM through a pilot project along with support from the management and other external enhancing activities. KM improves operation effectiveness, efficiency, and increases clients' satisfaction. Likewise, Work Connect is currently having some knowledge sharing activities with more activities that can be introduced to add more benefits.

The findings are expected where it is like the literature.

Based on the evidence found from the findings, it was recommended that in short-term, the host may introduce lesson learned, best practice, and appointing a knowledge management champion.

In the long term, Work Connect may implement these recommendations; introducing KM software and embedding KM culture into the organisation.

## CONCLUSION

In summary, this project recommended ten short-term and long-term recommendations based on the evidence found through a mixed data collection method.

The recommendations have helped guide Work Connect to plan for their business direction in future using the recommendations listed in this project.

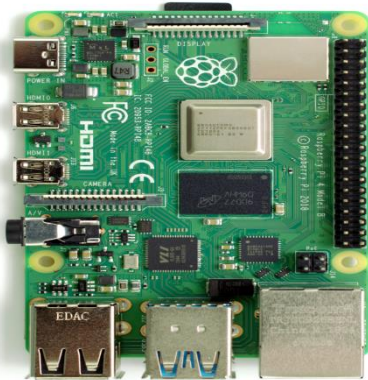


# IoT

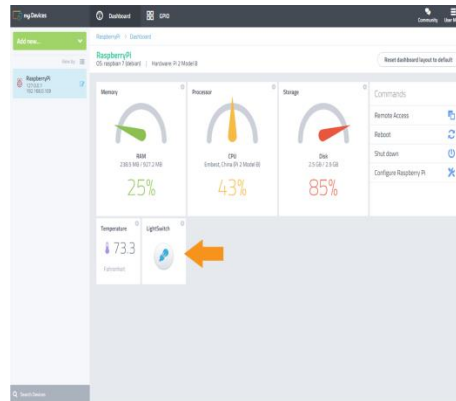
Team: Jitto Thomas, Gokul Shaji

Advisor: Dr Hamid Mohroeian

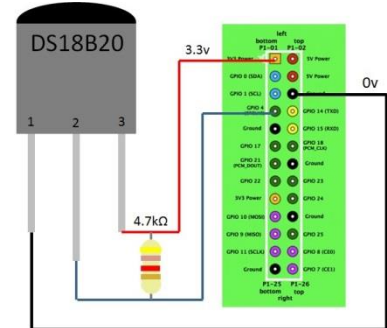
Client: Steve Cosgrove



Insert of Raspberry Pi



Example of Cayenne IoT platform



Temperature sensor connection

## INTRODUCTION

The purpose of the project was to document the code used in the IoT system created by our client. During our first meeting client explained the overall working of this system. The system was used to create a low-cost environment for reading real time field data like temperature, humidity, pressure in an area using different sensors and making it available to stakeholders. The purpose of doing this documentation is to easily understand the use and the functionality of the code to the users and developers in future.

## DEVELOPMENT

The client allowed us to clone his GitHub repository for copying all code to our repository.

The programming languages used were mainly written in Python language. Learning Python was the first step before we started the code documentation.

A sample document to the client was submitted which explained the working of how feedback was received in the main programme and how the feedback was viewed. We then added a UML diagram of the code and block diagram of the overall working of the document. This document

also included the detailed explanation about the functions used in the programme.

## CONCLUSION

To Initiate project development the following were studied:

- Studied the program concepts,
- analysed the functions usage,
- obtained the layout and core concepts.

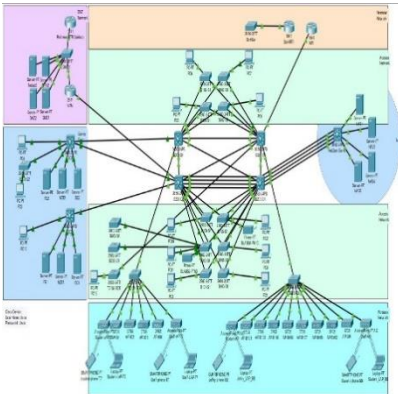
This project also helped us gain more clarity on how an industrial project is carried out and how to create paper documentation of the project.

# IP Migration

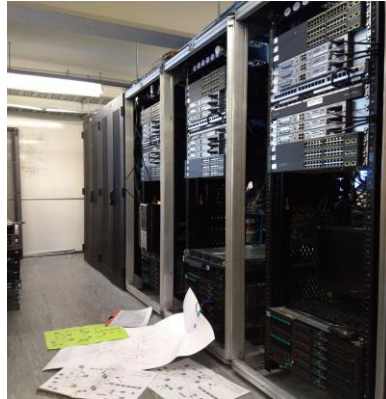
**Team:** Achyut Ranjit, and Pradeep Chandimal

**Advisor:** Paul Bryant

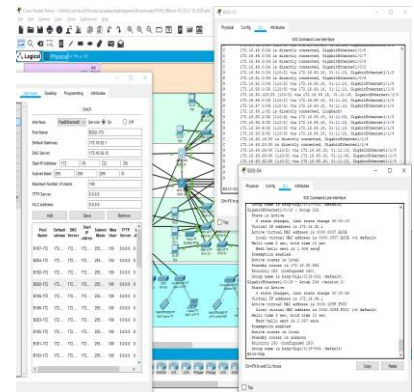
**Client:** Jeffry Echano



Simulate IP Migration on Packet Tracer



Requirement Gathering



Simulate Current Network

## INTRODUCTION

IP migration was from a client requirement that simulates the existing WelTec SoIT B-Block network and provides end to end connectivity using various testing methodologies. Our project team was tasked to simulate migration with best possible new IP address range followed by post-migration testing producing a comprehensive IP migration plan.

WelTec understood the magnitude of guideline and migration plan to follow their actual IP address migration on SoIT B-Block network. WelTec SoIT is in the process of selling existing their IP range to international buyers because it uses a public IP range.

## DEVELOPMENT

The methodology we selected for this project was hybrid white papers. This is a combination of two internet 'white papers'. The white paper's maturity models and the project environment may have a better success rate on an IP migration project than other standard project methodologies because the project environment is also a key factor in project success. The methodology used establishes a relationship between methodology and project success. This maturity model has seven steps and they are: Clean-up, Documentation, Research, Pre-migration Testing, Execution, Post-migration Testing and Turnover.

In the Clean-up phase, the team started by gathering the project requirements and followed by generating all the planning documents. While doing the requirement gathering the team analysed and validated existing B-Block network infrastructure to update the network diagram. Once the systems survey was complete the project team started

simulating the current network on Cisco packet Tracer. Network engineers used their industry experience and academic knowledge to build the entire B-Block network with end to end communication. The testing team then conducted a pre-migration test with more than 100 test cases, which was a significant phase of this project. The team encountered configuration errors and managed to troubleshoot by producing a root cause analysis report.

During the simulation of a new IP address migration, the project team identified the IP migration procedure with best practises. This was the active phase where the team decided the migration should be done overnight with a migration window or step by step without having network downtime. Post-migration testing phase confirmed the network works as it did before the migration. This will eliminate users' support calls for IT support.

Finally, our team prepared the IP Migration Plan and recommendation documents to align with all exercises.

## CONCLUSION

The team was successfully able to meet all the client requirements and produce ultimate "IP Migration Plan with Recommendation" document as their actual network migration project guideline.

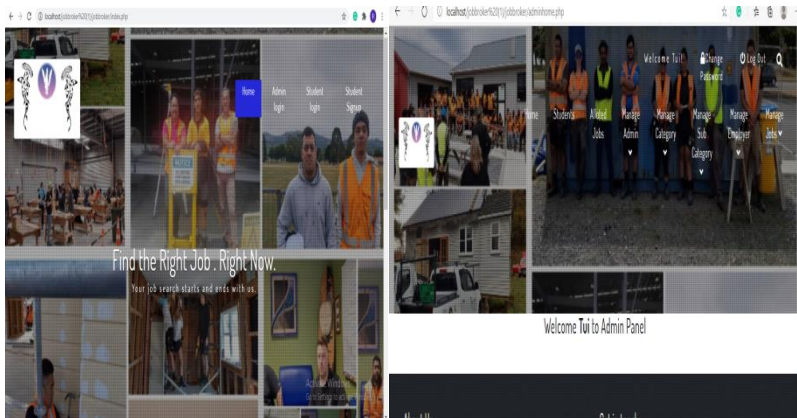
Migration is not a rare phenomenon in the enterprise network; therefore, this project gave opportunity to prepare for real industry experience. The project team invested significant amount of time for planning, system analysis and testing prior to simulating the migration. This was directly contributed to the success of this project.

# Job Broker v2

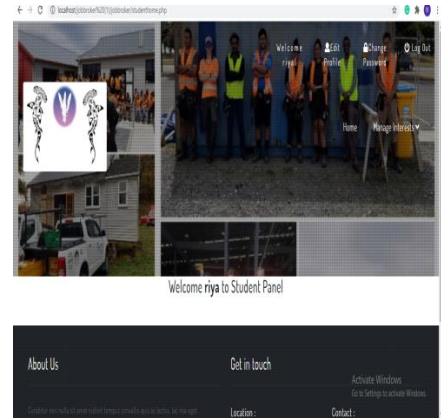
**Team:** Riya Bhakoo, Karan Sharma, Shubham Sarwal and Bhavik Patel

**Advisor:** Terry Jeon

**Client:** Tui Bradbrook



Home Page of Job Broker Website



Dashboard of Admin Panel

Dashboard of the User Interface

## INTRODUCTION

Job Broker website is for students of the Wellington Institute of Technology (WeITec) and Whitireia Community Polytechnic, Porirua Campus.

This website is managed by Tui Bradbrook. Students could easily access the user-friendly job portal in this website and register their details. The job portal can guide you to diverse job options as per the qualifications registered.

Earlier clients needed to record the information through MS-Excel which is quite difficult to manage and students were not able to register themselves. The Job Broker platform now makes it easier for clients to retrieve the information and students to register themselves into the portal and apply for jobs.

## DEVELOPMENT

- We used php language at the frontend and used for the backend MySQL for creating this website.
- The development phase we used PHPSTROM IDE.
- For the database we used localhost server XAMPP.
- Development began by creating system analysis and design documentation.
- Our team created use case and from there we decided on the rights of the user and admin.
- An activity diagram was created which showed all the processes for the website with actions and results.
- ERD diagram was created for the database with seven tables as per the following:  
Student, student\_ interest, job\_ placement, job-list, category, sub-category and employer.

- Sequence and system sequence diagrams were created to show all the process of data and then wireframe which showed what the website would look like.
- Coding started whilst preparing the system analysis. We developed a long in form for students and admin. If a student is not registered with *Job Broker* then student must register first. There is a student signup form that allows the student to fill in their details. Details can be updated after registration and the password can be changed by the student if they wish.
- Once a student has registered their profile and interest admin are then able to see the student profile and download the student's CV. Admin can allocate jobs as per the employer's requirement.
- Admin are able to add another admin, add employers and after allocation of jobs the student data is then automatically removed from student database.
- Functions are also tested by using functional testing manually. Test cases are created in the Excel sheet and then proceeded with the Integration Testing, Unit Testing and User Acceptance Testing. This ensures that the website will be User Friendly.

## CONCLUSION

In conclusion, the Globe Developer team developed a website called *Job Broker* as per the requirement of the client. The outcome of the project has been successfully met.

Students can obtain a job from this portal and the client is able to view the online registrations from students that displays their details and that match the requirements and skill set of the employer.

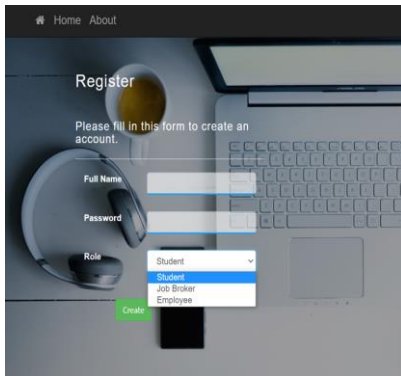


# Job Broker Online

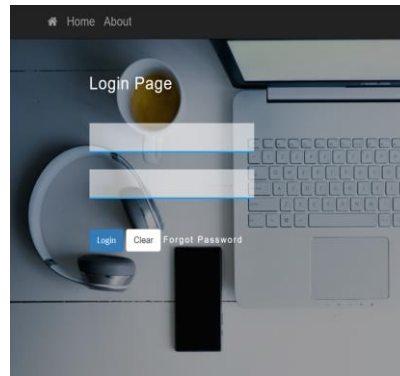
**Team:** Yuqing Yang, Elamparithi Ravi, Sivabharathi Velladurai

**Advisor:** Dr Abdolreza Hajmoosaei

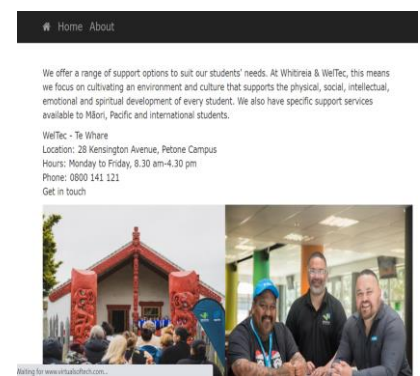
**Client:** Tui Bradbrook



Registration page



Login page



About page

## INTRODUCTION

In this modern world technology development is important as computers are leading the way. It is important that educational institutes help students to find jobs.

To assist students studying in the local community our client requires a web application that can have students register their details and employers can post available jobs in the job portal. According to the matching of this information, our client (Job Broker) can suggest a suitable job for the students.

*Job Broker Online* web application manages the student data, employee data, and searching functionality for the client. It is optimized with supporting search engines and an internal search feature.

## DEVELOPMENT

As per our client's requirement, we have started our development which will solve the current issue.

There are three users involved in this application Job broker, student, and employer. Registration must happen before accessing the job broker system. After login, students will be able to view all the information about their profile, and they will have the ability to edit and delete their own profile. The client can view all those registered and the job list from employers.

We have used the Kanban methodology for this project. We planned for six milestones starting from the project proposal, UML diagrams, development, testing, and handover.

Once the design was approved by the client, we started the web application development using ASP.NET which is more familiar for our team. We used HTML and CSS for the frontend development. Data annotation is used for validating the models and scaffolding can generate the codes. We have installed Visual Studio for coding.

*Job Broker Online* web application is developed with the following features: a register, login, about, search, and some common functionalities like edit and delete for all three users. We did testing for each scenario, integration testing, security testing, and defect report, most of the issues were fixed.

We have done the user manual and technical manual so that the client is able to understand our system development and how to work with it. It will also benefit further iterations of this project.

## CONCLUSION

Our team has achieved a quality product for our client.

*Job Broker Online* web application has been our first-time work experience with a live project, and we gained more technical knowledge, project management skills, and especially team co-ordination. This will be a steppingstone for our career growth.



# Kai Kitchen Event Post COVID-19

By: Mya Misky

Advisor: Dr Fahimi Ali

Host Organisation: Linden Community Centre



Mya Misky

Linden Community Centre

## PROJECT SCOPE

The project focused on how the Kai Kitchen event at the Linden Community Centre had to adapt with the presence of COVID-19. With the current situation of the world, COVID-19 has derailed what was deemed normal with this I wanted to explore how it impacted the Linden Kai Kitchen event. Alike many others, this is my first pandemic so I was interested in how this information could be useful to the Linden Community Centre but also many other organisations.

The objective of this project is:

RO1: To identify ways to adapt the Kai Kitchen at the Linden Community Centre to follow COVID-19 restrictions and guidelines

This objective was guided by the following project research question:

RQ1: What are ways to adapt the Linden Kai Kitchen to follow COVID-19 restrictions and guidelines?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic area includes COVID-19, Event Guidelines and Restrictions, Kaizen and Organisation Adaptation Theory.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research question, a mixed method approach was used. The data was collected through in-depth interviews, with those who volunteer for the Kai Kitchen event. Paper surveys were also actioned for those both who attend the event, and those who volunteer to coordinate the event. Lastly observation of the event and environment was also implemented.

Data was analysed using charts and graphs to identify main themes or trends.

It was found that many people did not feel like they were impacted by the COVID-19, especially post lockdown as many relied on others already to such tasks as grocery shopping.

The findings are both expected and unexpected where it is both like and different than the literature.

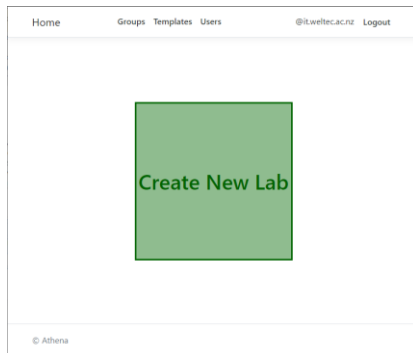
Based on the evidence found from the findings, it was recommended that in short-term, the host may; Implement both better and more visual signage, Control how people enter the space and Create portioned amounts for event attendees.

In long term, the Linden Community Centre may implement these recommendations; Introduce monthly feedback surveys and rearrange the space and equipment.

## CONCLUSION

In summary, this project recommended three short-term and two long-term recommendations based on the evidence found through a mixed data collection method.

The recommendations have helped the Linden Community Centre in some way to solve their issue and to guide them to plan for their business direction in future.



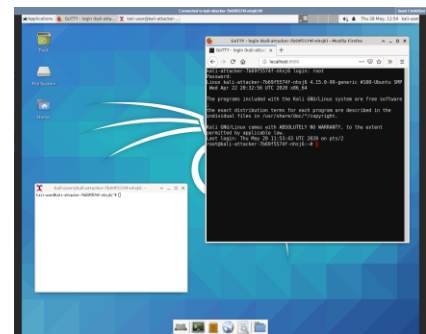
The Main Screen

## Template List

Create New

Path	Template Name	Lab Label	
template1	Juice Shop	juice-shop	Edit   Delete
Templates\\Template2\\	SQL Injection	example	Edit   Delete

Viewing available Labs



Example of a Lab Interface

## INTRODUCTION

The client, Paul Bryant, a senior Lecturer at the Wellington Institute of Technology wants to reduce operating costs for the School of IT and Business by replacing Netlab, which provides a virtual lab environment to students over the School's network. Netlab enables students to access pre-configured virtual machines for the purpose of completing assigned lab work.

The project team developed Kubernetes-based lab environments, using Docker containers instead of virtual machines, and a web interface to access the lab environments. As well as addressing the primary goal of the client and developing a replacement for Netlab, the team were also able to integrate their web application into the School's existing Google account system, allowing them to sign in and have their role within the School recognised automatically.

## DEVELOPMENT

During the Development phase of the project, the team implemented an iterative development model, with development split into three iterations. At the end of each iteration, the team had a status meeting with the client, where the team would demonstrate the deliverables for the iteration, and seek feedback.

The Kanban workflow management method was also implemented to help manage development at the task level. Each task was assigned its own Kanban card, and was treated as its own 'mini-iteration', with the team going through design, development and testing for each Kanban card.

The web application was developed with ASP.NET Core framework, since it provides the basic UI for a web application, and allows the end product to be deployed on Linux server or Docker containers.

Its functionality was then extended through the use of the Entity Framework (EF) Core framework and ASP.NET Core Identity API.

Lab environments were developed with Docker containers instead of the virtual machines used in the current Netlab solution. This choice brought with it performance benefits, as a container host does not need to emulate the hardware normally associated with a computer system, but also challenges, as Docker containers do not include a 'friendly' user interface for new users by default. However, the team was able to work past this.

Individual components of the system were tested as they were developed, with test results delivered with other iteration completion outputs.

The project team was able to adjust to the COVID-19 lockdown, making great use of the School's G Suite tools and applications. The team used Google Chat, Meet and Calendar for communication, along with Google Drive for file sharing.

## CONCLUSION

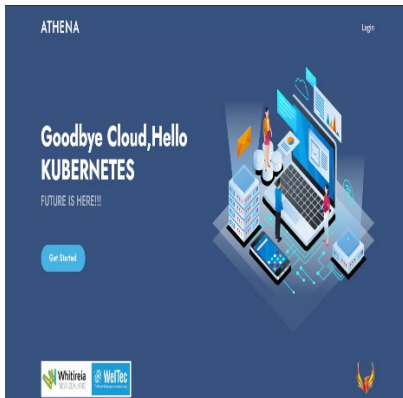
The project team learned to work together despite the differences in each team member's academic goal, situation, and technical background. The team had to learn about unfamiliar technologies, while still ensuring that development targets were met. However, thanks to the comprehensive design documents produced early in the development, the team was able to deliver on their commitment to their client.

# KUBERNETES

Team: Team Phoenix

Advisor: Richa Panjabi

Client: Paul Bryant



Main Page of web application



Lab Reservation List page



Running Operating system in web application

## INTRODUCTION

Project's client is Paul Bryant, senior lecturer at Wellington Institute of Technology (WelTec), brought light to a concept regarding the virtual lab. He chose to have a web application system which can run virtual labs using the latest up to the minute technology "Kubernetes" and "Docker".

This type of application can be used as an educational medium and helps students become familiar with current technologies. NetLab is also used in a tertiary setting and the functionality of Kubernetes is seamless using new technology is the vision of the client.

Cloud technology is growing rapidly in this area using open source operating systems for learning, testing and development. At the educational level students do not have many physical components that can install multiple OS's on personal systems. To overcome this issue students are using virtual labs.

While team Phoenix found this as a great opportunity to utilise an already developed web application system named "Athena". This offers virtual labs to the user without installing extra components to the system. This will be the system where a student can reserve a lab and then the user can have multiple operating systems to access at a single run without setting it up every time on their computers or laptops. This application can be accessed through remote locations. This Web application project is mainly focused for students.

## DEVELOPMENT

To implement the idea and develop the Kubernetes system the following steps were performed by Team Phoenix to deliver.

- Initially, research was undertaken on the internet and documents on the Kubernetes system was provided by the client. Once we had a clear understanding of Kubernetes, we were able to give a brief overview to the client.
- The methodology we chose was the Kanban methodology to enhance this web application. Our next step was to make a proposal for the client and obtain his sign-off. Following that, we arranged the required tools we were going to use in web application development. We selected the legacy technology for coding and selected Linode platform for networking.
- After the setting up all the tools and plan for the web application was completed, we started to work on the system design and analysis. We created our Storyboard, Use Case diagram, Sequence diagram, Activity diagram. This leads to a clear workflow of the system.
- The development phase is where we initially started working on the network using Linode as a cloud platform for installing Kubernetes cluster and we also used Docker hub. On completion of this part we switched over to the front-end phase of the project.
- Manual testing was carried out on the initial test cases and then we evaluated them accordingly while generating a test report in line with that.

## CONCLUSION

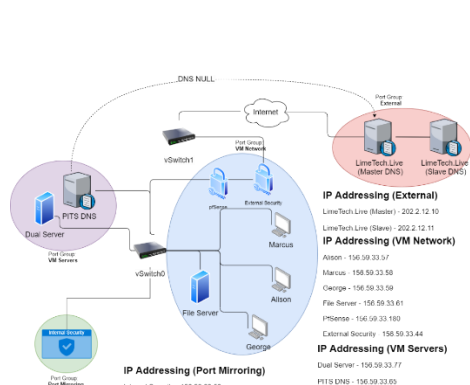
This web application project will mainly focus on assisting students to use the latest technology.

# Linux Threat Analysis: Digital Corpora

**Team:** Diamond Zhou, Philip Machado, Oliver Whitehead and Thamena Essahaty

**Advisor:** Sandeep Vankadari

**Client:** Paul Bryant



509897	3230.125531	156.59.33..	156.59.33..	DNS	53	37560
509896	3230.122489	156.59.33..	156.59.33..	TCP	33404	514
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509894	3230.037041	156.59.33..	156.59.55..	ICMP	902	12341
509893	3230.037417	156.59.55..	156.59.33..	UDP	902	32301
509892	3228.215211	156.59.33..	156.59.55..	ICMP	902	40528
509891	3228.215005	156.59.55..	156.59.33..	UDP	902	40528
509890	3227.951644	156.59.33..	156.59.55..	ICMP	902	13747
509889	3227.953510	156.59.55..	156.59.33..	UDP	902	13747
509888	3227.446506	Vhuare_57..	Vhuare_c2..	ARP		
509887	3227.446509	Vhuare_c2..	Vhuare_57..	ARP		
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509885	3226.691741	Vhuare_57..	Vhuare_5e..	ARP		
509884	3226.518197	156.59.33..	156.59.33..	TCP	36742	514
509883	3226.518074	156.59.33..	156.59.33..	RSH	514	36742

Answer RRs: 0  
Authority RRs: 0  
Additional RRs: 0  
Queries:  
v vvaakawinq.evill.limetech.live: type NULL, class IN  
Name: vvaakawinq.evill.limetech.live  
[Name Length: 30]  
[Label Count: 4]  
Type: NULL RR (16)  
Class: IN (0x0001)  
[Response\_In: 509925]  
0000 00 0c 20 7c 44 a5 00 0c 29 9e 27 79 06 00 45 00 |D...)|y:E  
0010 00 4c 00 00 00 00 11 bf b0 9c 3b 21 39 9c 3b |L @#...;19;  
0020 21 41 92 08 00 35 00 38 83 c4 12 3c 00 00 01 |A:~B S<<<<  
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0040 0e 71 04 65 76 69 6c 0e 6c 69 6d 65 76 65 63 |e:evill.limetech  
0050 04 6c 69 76 65 00 0a 00 01 |live:....

Scenario Environment Topology

Project Team Logo

A Produced Packet Capture

## INTRODUCTION

The Linux Threat Analysis project was undertaken to address shortage of scenarios available to teach the analysis of digital artifacts left on UNIX systems following security incidents. It was initiated as an effort to provide WeITec courses with educational materials that can be used in refining and assessing the forensic skills of cybersecurity students. The project also had the potential to contribute to Digital Corpora, a global repository of datasets used in computer forensics education research.

The aim was to design a realistic, computer-based crime, set up a virtual environment for that crime to take place in, and simulate that crime - capturing traces left by attacker and victim alike in evidence files that students could learn to examine with tools and techniques of their choice.

## DEVELOPMENT

Once our bid was approved, we explored the purpose and possibilities of the project in a system proposal. This proposal set many key decisions in stone, including our technical methodology, Scrumban – an iterative approach that divided development into sprints.

Our first sprint concerned research, analysis, and design. It was here that we drilled down our crime – the theft of confidential company data by a malicious insider. We hashed out the details of involved devices, fictional personas, digital artifacts, and exploits. Our main sprint objective was to have a conclusive event timeline that told

about the who, what, when, where, and how of our scenario.

After delivering our design, we then brought it into reality, pulling through following almost four weeks and one benevolent milestone extension. The implementation involved configuring Kali, CentOS, Ubuntu, and SecOnion virtual machines hosted on vSphere and VMWare.

Our topology was ambitious, forcing us to put our heads down and overcome new and unforeseen challenges. At the sprint's end, we had various workstations, two functional DNS servers, a file server hosting remotely mountable shares, caching proxy server, network monitoring box listening on a mirror port, domain blacklist, firewall, IDS, and dual-purpose central logging/mail server.

In our final iteration, we simulated our scenario over multiple days and captured traces of our actions in memory, over the network, and on disk. Investigative questions for students and supplementary material for instructors were then developed to accompany our evidence files, altogether comprising the major anticipated products of our project.

## CONCLUSION

The Linux Threat Analysis project has reached all planned milestones thus far and is in the final stretch leading up to closure. Despite the challenges, we learned about the unreliability of plans and expectations and we could still anticipate the achievement and delivery of major project outcomes to our client.



# MTTP Web Ops

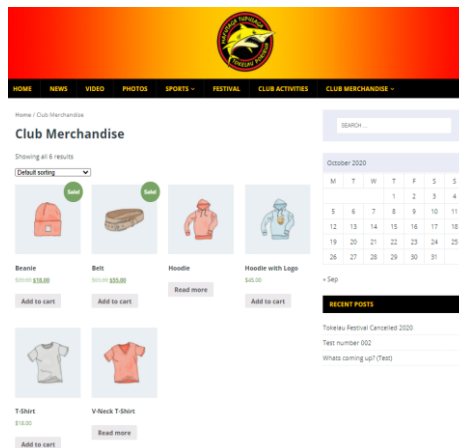
**Team:** Patolo Patelesio and Taisson Lealaisalanoa

**Advisor:** Tony Assadi

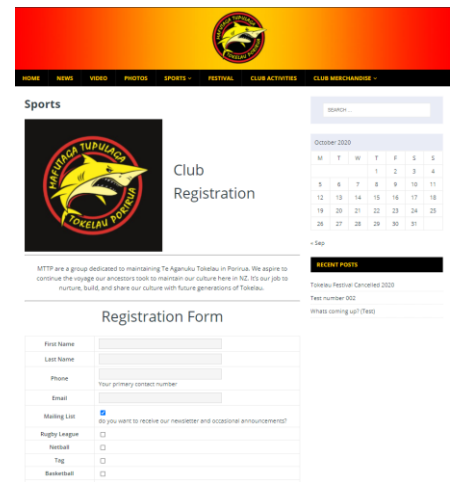
**Client:** MTTP Inc, Alex Patelesio



Web Application - Home



Club Merchandise - Orders



Club Registration - Members

## INTRODUCTION

MTTP (Porirua Sharks) is a local sports and cultural Tokelau youth club that has been in existence for over 45 years. The goal is to revolutionise the clubs main operations by developing a web application to digitise and centralise their manual processes of promoting and distributing club information, registering new club members & taking club apparel orders.

## DEVELOPMENT

To help the club achieve its objectives, we needed to build an attractive easy-to-use web app for club members to interact with, complete registration forms and make an order for club gear.

Regular consultations with club members helped form good objectives for this project with some flexibility to look at more if/when time allowed.

Two Content Management Systems were analysed: WordPress and SilverStripe, with the former being more suitable because of its level of user-friendliness and available learning resources online.

During the design stage, the client thought to use similar templates to professional sports teams where the look is simple, effective and easier for admins to manage.

The existing process of data collection is bottom-up and needed to be a centralised top-down approach to be able to manage its many operations/sport codes under the one organisation. A login feature added for club officials with permissions to administer the two databases of club registry and club apparel orders.

## CONCLUSION

First iteration of club web app requirements completed. Flow, look and feel achieved with more content required from MTTP. Functional web site that has gone live.

# New Zealand First Aid Kit Market Competition

Grab & Go chances and challenges

By: Kevin Phan

Advisor: Dr Fahimi Ali

Host Organisation: Grab & Go Company



Kevin Phan



Grab & Go company logo



Grab & Go first aid kits

## PROJECT SCOPE

The project focused on market competition situation of Grab & Go company. This is due to the company wanting to gain a thorough understanding of the competition between company's products and competitors' products in terms of price and content comparison.

The objectives of this project are:

Objective 1: Price comparison

Objective 2: Contents comparison

Objective 3: Competition situation

These objectives were guided by the following project research questions:

Question: "What can Grab & Go do to better understand their competitors?"

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic area includes natural and human disasters in New Zealand, first aid kit, competitive analysis, supply chain management.

## FINDINGS AND RECOMMENDATIONS

To answer the project research question, a primary quantitative approach was used. The data was collected through Grab & Go website and the competitors' websites.

Data was analysed using comparison methods with bar charts and tables

Answers were found for the above research question. Firstly, Grab & Go products' prices are

better or equal as much as 75% surveyed products. Secondly, the contents of products are also better than some other competitive products. Lastly, Grab & Go currently has the competitive advantages in the market.

The findings showed that it is like the information in the literature.

Based on the evidence found from the findings, it was recommended that in short-term, the host may maintain current pricing policies, listen to feedback from customers and stakeholders about product content, retain strong relationships with current medical supply partners.

In the long-term, Grab & Go company may implement these recommendations, focusing on customised products and diversifying supply sources.

## CONCLUSION

In general, this project recommended six short-term and long-term recommendations based on the evidence found through a primary quantitative data collection method.

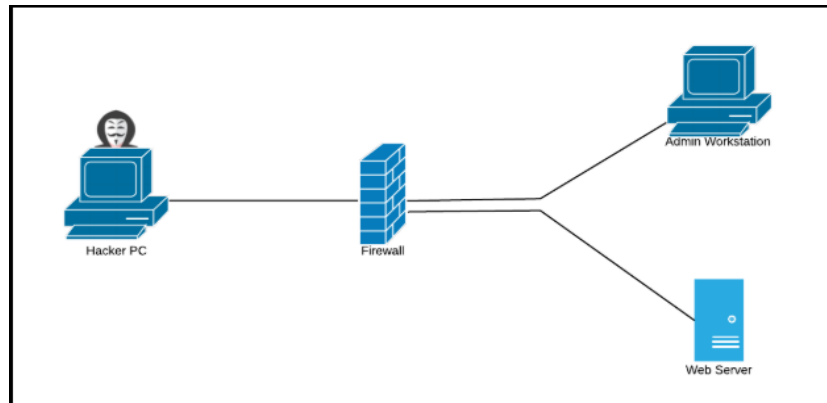
The recommendations have helped Grab & Go company in some way to solve their competition doubts and to guide them to plan for their business direction in the future.

# NMDF Project

**Team:** Anurag Regmi, Inderjit Singh and Purnansh Davawala

**Advisor:** Drew Duncan

**Client:** Paul Bryant



Project logo for NMDF Project

Enterprise Network Topology for NMDF Project

## INTRODUCTION

The key goal of this project is to create a learning material for future cyber security students that covers an attack scenario, a post-incident investigation and forensics in an enterprise network. The students will be able to access a pre-configured network of hosts from WelTec's NetLab platform and follow along the case study from the beginning of the attack phase to the end of the analysis and report phase.

Since it is one of the first projects of this specific kind, WelTec will be able to reap the benefits of its uniqueness by creating the opportunity for students to conduct a real-world cyber-attack life cycle and incident response process.

## DEVELOPMENT

The project was developed in six major stages. The first phase of initiation consisted of identifying the key stakeholders, formulating the project management plan and obtaining the project bid approval.

A draft roadmap of the project was developed in the planning stage which guided the team to execution. Requirements were gathered from the client after which a detailed project plan was developed, and the appropriate tasks were scheduled in the Gantt chart.

The execution phase was carried out following Agile-Scrum methodology where each deliverable was produced in three-week sprints. The first two phases of the sprint were focussed on developing a full-fledged attack scenario. The latter sprints were focussed on forensics investigation and production of relevant walkthrough documents for the investigation, to serve as a guide to the tutors and students.

The entire project was monitored and controlled using different documentation including weekly progress reports for the team, status reports for clients, project log, research log, issue log, risk register, and so on. This was done to ensure the resulting product was of the highest standard.

A final project report was submitted as a closing of the project, which was complimented by a final presentation, as well as lesson learnt report presented to the panel.

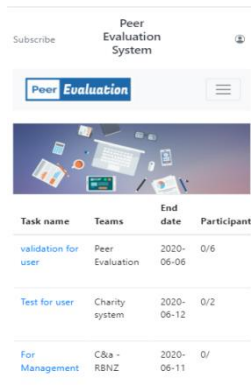
## CONCLUSION

The final product of the project will be a comprehensive learning material for prospective Information Security students at Wellington Institute of Technology (WelTec). This learning material will cover a case study to align with the learning outcomes of the Information Security courses taught by Information Security lecturers at WelTec.

**Team:** Yao Lu (Project Manager), Kishan (Designer, tester), Arun (Developer, tester)

**Advisor:** Manish Singh

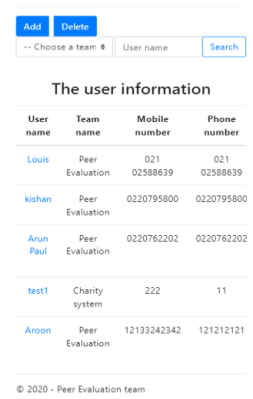
**Client:** Robert Sutcliffe



Home page of the peer evaluation system



The assessed page to evaluate the team



The team information of the peer evaluation

## INTRODUCTION

Evaluation contributes to our understanding of program effectiveness so that activities can be tested, developed, and improved. It can also help to improve efficiency and identify the most valuable and efficient use of resources. This is so we do more of the things that work and less of the things that do not.

The main objective of this project is to develop a website to allow more organisations to use evaluation and employee's feedback function of this system. It allows more companies to know more about the advantages and disadvantages of their employee's skills and using these data make improvements of the skills of targeted employees as well as improve the efficiency of the enterprise.

## DEVELOPMENT

**Initiation:** At the beginning, we did not choose this project but following the advice from our advisor and the client, we realised the uniqueness of the peer evaluation project. Despite the COVID-19 outbreak we were able to conduct smooth communication with the client and we successfully completed the initial phase of the project and requirements analysis.

**Design:** We used the Azure software to design the page and communicate with the client through the page, which helped us further understand the real needs of the client and laid a favourable foundation for the next development work.

**Development:** We used Java for the development of the system, which provided stable operation of the system and security. In addition, we adopted an agile development method, which made our development run more smoothly. The use of tools such as Trello, SVN, Zoom Meeting, TeamViewer helped us to successfully complete the project development under the Covid-19 pandemic situation.

**Testing:** We used unit tests and functional tests. The main method of testing was black-box testing. We also used Cloud servers to help us with system integration testing.

**Client Handover:** Our customers were happy with our project, and it was amazing that we were able to complete the project despite the pandemic. Although we wanted to offer more features, time was very limited.

## CONCLUSION

The peer evaluation project was a wonderful beginning of our IT career in New Zealand. It was a great idea, and we tried to make it happen, and here we are. Thanks to Robert Sutcliffe, he was a very good client and teacher, and was always patient and willing to help. We hope that students can implement other functions of this project in later iterations, such as Question Bank, the Task Role, etc. When you are done, he will surprise you. In a few words, when you do everything well, you will get a fair evaluation from others.

If you never try, you will never know.



# Petrol Price Comparison App

Team: Nicole Priddey and Angela Yu

Advisor: Terry Jeon

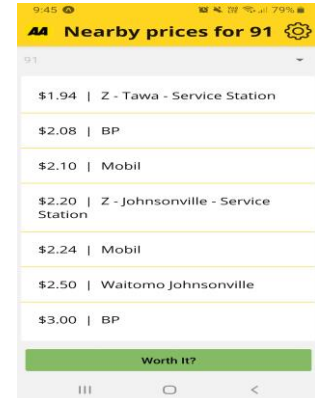
Client: Mark Stockdale (AA)



Photo of Nicole Priddey



Photo of Angela Yu



App Main Page

## INTRODUCTION

Our project is to create the Petrol Price Comparison application that is intended to compare petrol prices from gas stations nearby. 'The Worth It' feature is a point of difference to the one already in the market. It will display the current fuel prices for the stations, allow users to update the prices, and have a *Worth It* function that will inform the users of driving further for a lower price compared to going to your closest station.

There are many consumers wanting to find the cheapest fuel price. The main aim for this app is to allow customers to not only see the current prices but advise customers if it would be worth travelling the further distance to obtain the cheaper prices. The app will be a service that AA can offer to their customers though it was developed under the assumption that the AA does not have a business investment in this app.

## DEVELOPMENT

When we started our development process, we had to work at home due to COVID-19 lockdown. We kept up to date with the daily team meetings through Facebook Messenger Calls.

Nicole was working on the back end of the app and part of the front-end while Angela was working on the front-end of the app. We were using Java for the back end and 'React Native' for the front-end as the client wanted to use 'React Native' for their applications. As we were new to using this new programming language, it was a struggle to begin with as we had to learn through tutorials online during the development phase.

There was not much client involvement at the beginning of the project. Around Week 9 of lockdown, we had weekly meetings with the client through Zoom. We did the same for the advisor meetings, which was also through Zoom.

There was a bit of trial and error to set up the infrastructure for the middle tier of this project since we were not able to receive the support we needed and therefore it took longer than expected.

We discussed with the client to form a more valued plan to prioritise the *Worth It* function and agreed to remove some of the features such as photo recognition, filter the price list, and open the station in Google Maps.

Once we implemented the basic functionality as well as the core functionality that the client wanted, we tested using different testing methods such as manual and integration testing to check for any errors. We documented each test with further details on what the tests covered.

## CONCLUSION

We have developed an app with basic functionality and the main functionality that the client wants. We have changed our initial scope and removed some of the deliverables that were not of priority to the client to focus on what was important.

This app is given to the AA as a prototype. They are not planning to commercially pursue it further. We had finalised the files for the client handover and gave them these including the user manual and handover document containing details of deliverables, bugs/defects, and ideas for future development on other iterations of this project.

# Porirua War Stories

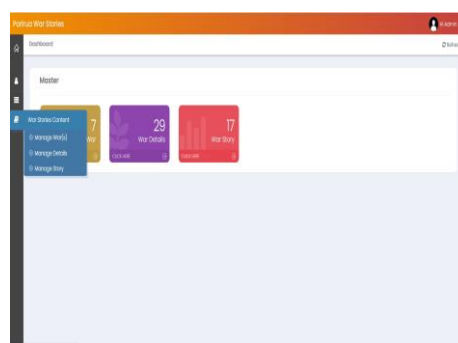
Team: Mansi Patel and Aateka Vohra

Advisor: Aristotle Santos

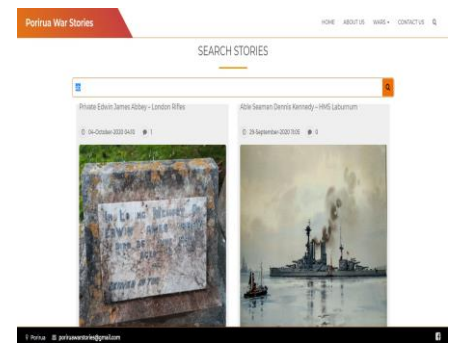
Client: Allan Dodson



Homepage



Admin Panel



Search Functionality

## INTRODUCTION

Porirua War Stories is the website of stories of servicemen and women from Porirua who fought for the nation. The author of this website intends to share the stories gathered through meaningful research where the possible families provide the input of mainly photos to go with the stories.

The purpose of the *Porirua War Stories* project was to give the website a modernised look to help capture the war stories, a dynamic website with a search facility that is easy and fast to use across multiple variables, an improved database storage, frequent admin to easily add, update, and delete the stories by using the admin panel, and links website with social account, so its message can be widely visualised.

## DEVELOPMENT

The *Porirua War Stories* project is developed with OpenUP methodology. In the Inception phase, we gathered requirements and prepared a business proposal which described in depth, how the project was going to commence.

After the business proposal, we worked on the system analysis and design section, in which we analysed the project requirements clearly and created a Use Case diagrams for both frontend and backend of the site.

After that we presented two wireframes to the client which will help them to understand how the website will look. The client has approved one of them. These were all part of the Elaboration phase.

After the client has approved the wireframe, we then turned the wireframe into a high-fidelity

design that shows exactly how each page of the website would look like. We set the wireframe of the frontend and designed Homepage, About Us, Wars (display the war category and story), Contact us and Search.

We then prepared the database in SQL Server Management Studio that included tables and stored procedures. We developed the website in ASP.NET (C#) using .NET Framework, Visual Studio 2017. We developed a Login page to access the backend admin dashboard that displayed the total number of added records. It also included the Manage Admin (that enabled other admin to be added), Manage About Us, Manage Wars, War Details, and War Story where each page had a search facility. We used manual testing to test the website. We prepared the test plan and test cases for both frontend and backend. The website design, development, and testing were part of the construction phase.

The client handover and website hosting were part of the transition phase. We suggested the hosting options to the client and that decision is pending.

## CONCLUSION

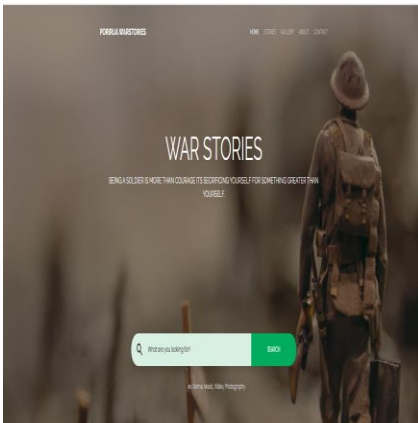
From the above explanation, it can be considered that we fulfilled all the essentials of this project on time and to the satisfaction of our client.

# PORIRUA WAR STORIES 2

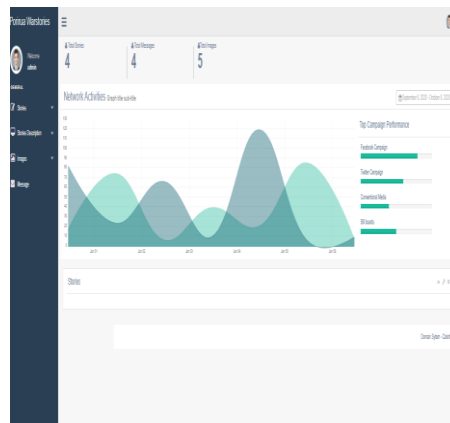
**Team:** Kishan Gondaliya and Harpreet Kaur

**Advisor:** Aristotle Santos

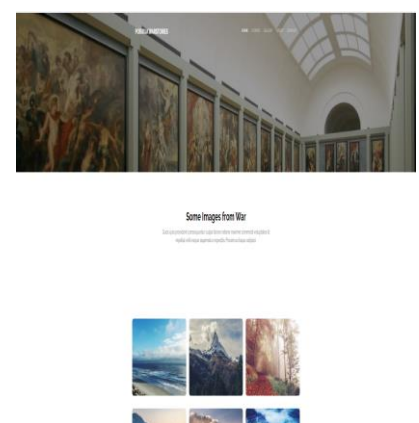
**Client:** Allan Dodson



Porirua War Stories Website Home Page



Admin Profile



Gallery Page

## INTRODUCTION

Porirua war stories are a website which publishes the stories of the families whose histories are connected to the WW1, WW2, and Boer War etc. This website contains over 500 war stories and is frequently updated. When the website is completed the young generation will learn about the history of the different wars.

The main purpose of this website is to connect with society so that our client can share the stories of Porirua men and women who served in conflicts. This website helped the current and next generation to understand what is going on and how it transforms the world and our society. From this project we will produce a fully functional modern website. We will add the features where the Admin can easily Add, Delete or Modify the stories, photos, and descriptions about the stories.

## DEVELOPMENT

For development of this project we have used core PHP language with MYSQL database. For the designing of the website we have used the Bootstrap, HTML5, JavaScript, AJAX. For the development of this project our team used Waterfall model as a software development method. Our project is divided into five different phases as per the waterfall methodology.

### 1. Requirement Gathering and Analysis:

During this phase, we have gathered all the requirements of the project from our IT Capstone project. We met the client and discussed all the requirements and analysis required. Based on our team analysis we have

come up the decision that we are going to develop this project in Core PHP with MySQL database.

### 2. System Design:

After successfully choosing the programming language and analysis of the requirements, our team started working designing the website. We used Bootstrap 4 and HTML 5 for designing the website.

### 3. Implementation:

After completing the design, we started working on the database and backend part. In this phase our team designed the database and implement backend coding.

### 4. Testing:

Once the project was completed one of our team members started working on testing the project. In this project we had done functional testing and prepared the test documents.

### 5. Deployment:

After successfully testing the project, the final phase was deployment of the project which we will hand over to the client and institution.

## CONCLUSION

The outcome of the project - After development we created the website, Porirua War Stories. This website looks attractive and modern and from this website the young generation will learn about the history of the wars.

# PROJECT MEDICI

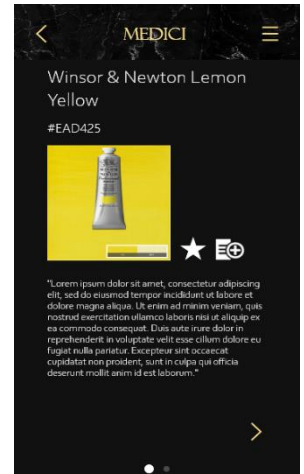
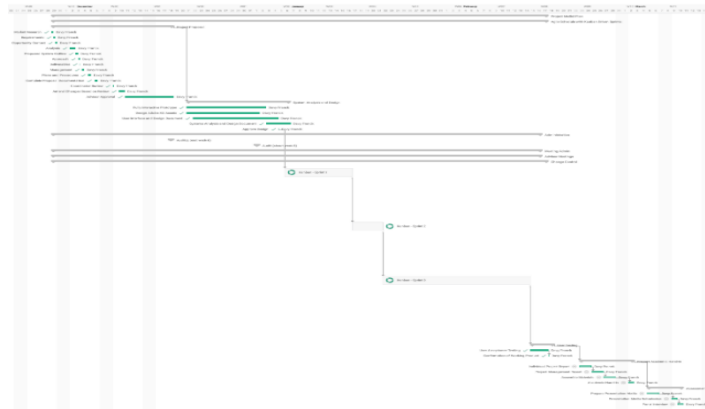
By: David Franck

Advisor: Ian Hunter and Chalinor Baliuag

Client: David Franck



Medici Paint Companion  
Launch Menu



Medici Paint Companion  
Paint Summary Screen

## INTRODUCTION

*Project Medici* was initiated in November 2019 to design and develop the *Medici Paint Companion*, an Android mobile application that would serve beginner, intermediate and professional painters alike. The system would be intelligent enough to identify colours from the real world and provide the closest matching paints to those colours.

Additionally, the system would have a comprehensive paint catalogue containing hundreds of paints across leading manufacturers. Users will be able to access each paint in a professional paint summary screen and view interesting information pertaining to that paint's history, colour properties and provenance, as well as helpful tips on how to use them.

The system will be driven by colour theory principles, allowing users to generate and view complementary, triadic and tetradic colour schemes for paint.

The objective of *Project Medici* was to use technology the business of creativity, establish a foothold in an observed gap in the market and develop a product that would prove invaluable to painters.

## DEVELOPMENT

Project Medici was developed using a hybrid combination of Agile and Kanban driven sprints.

A preliminary analysis and design effort would occur between 21 December 2019 and 6 January 2020. This included systems analysis and design for some of the more complex tasks in the project's backlog, as well as the development of a fully working prototype. For the rest of the project, analysis and design would occur in parallel with development.

**Sprint 1:** Commenced on 6 January 2020 and completed on 16 January 2020, this sprint involved the integration of the Android Camera API and the development of the inbuilt *Medici*

*Camera*. The *Medici Camera* would be capable of identifying the RGB value of colours from the real world and convert them into hexadecimal colour codes.

**Sprint 2:** Commenced on 17 January 2020 and completed on 21 January 2020, this sprint involved the integration of colour theory principles into the *Medici Paint Companion*. This required the development of algorithms to find complementary, triadic and tetradic colour schemes using the identified colours from the *Medici Camera* as well as methods to convert hexadecimal colours into the HSV colour space.

**Sprint 3:** Commenced on 22 January 2020 and completed on 11 February 2020, this sprint involved the completion of the final development tasks of *Project Medici*. Notably, the development of the *Medici Paint Catalogue* and the CSV Data Repository that would store the paint data. The latter required the research into, and collation of, hundreds of paints across leading manufacturers.

Additionally, work was spent creating a dynamic *Paint Summary* screen that would display a host of information pertaining to selected paints.

Lastly, this sprint involved the development of the paint identifier algorithm that would determine which paints were closest to users' identified colours.

## CONCLUSION

The project successfully ended on 17 February 2020 with all original requirements met, sans the *Paint Mix Recorder* and *Paint Inventory & Wishlist Manager* features, which had been removed from the scope.

Despite being an immensely challenging endeavour, the experience was hugely rewarding and saw not only the creation of the *Medici Paint Companion*, but also the acquisition of a range of new skills and understandings; understandings, not just on software development and project management, but broader insights into personal management and self-improvement.



# Request for proposal process improvement for an IT Services Consultancy Company

By: Tali Blumgart

Advisor: Dr. Fahimi Ali

Host Organisation: Theta



Tali Blumgart



## PROJECT SCOPE

The project focused on the issues of the RFP process for Theta. This is due to the process taking too long, wanting to have a better chance at winning proposals through professional looking proposals and having more time availability.

The objectives of this project are to:

- Minimise the time spent on RFPs
- Make accessing relevant information easier
- To make collaboration on RFPs easier with a consistent style, format and information

These objectives were guided by the following project research question:

- How can the Theta request for proposal (RFP) process be made more efficient and user-friendly

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic area includes;

- RFP software solution types
- Things to be aware of
- Re-organising/entering information in storage
- Process change management and improvement

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research question, a mixed method approach of primary and secondary data was used. The data was collected through observations, semi-structured interviews, Google Search and an analysis of peer reviewed articles.

Data was analysed using note taking.

It was found that common RFP questions get asked, there is an inconsistent style and format to their RFPs, their current process is inefficient, employees are concerned with time availability and more professional proposals and that SaaS was commonly used for RFPs.

The findings are expected where it is similar to the literature.

Based on the evidence found from the findings, it was recommended that in short-term, Theta may implement one of the four RFP software found, store documents by theme in SharePoint and implement DMADV Six Sigma.

In long term, Theta may implement these recommendations; Look for newer improved software and implement DMAIC Six Sigma.

## CONCLUSION

In conclusion, this project recommended a total of eight short-term and long-term recommendations based on the evidence found through a mixed data collection method.

The recommendations have helped Theta in some way to solve their issues and to guide them to plan for their business direction in future.

# RDANZI Events Management Website

**Team:** Jian Raga, Jinu Tharayil, Anand Sundaram, Kamalakar Uppala

**Advisor:** Richa Panjabi

**Client:** RDANZI - Kelly Norris

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## INTRODUCTION

The Roller Derby Association of New Zealand, Incorporated, represents the entire country in the promotion of roller derby events. However, due to lack of communication and promotion, many events struggle to attract support and officials.

Roller Derby is a lesser known sport within New Zealand, which has limited communication and event management tools to help organize their events. The current Roller Derby leagues in New Zealand use multiple Facebook pages to organise their bouts and their officials.

## DEVELOPMENT

The development of this project starts by gathering the requirements from the client. This process is carried out through multiple meetings in gathering the requirements and any additional requirements that the client may think of. These requirements are then put into consideration by our team of developers, deciding whether it would be possible to complete the project within the time that we have. One last meeting will then be conducted to confirm the client requirements.

We as a team then sat down and planned the development phase of the project, considering the time it would take for each core requirement of the website. We then created a plan on how to approach the project, dividing and grouping them initially into four iterations. Iteration 1 being user interface, iteration two being user profile pages development which includes the database, iteration three being events database, while iteration four was focused on refining the website and testing the complete website. Each iteration had to be tested to be able to ensure that all the features are working for each iteration.

Throughout the development phase, we would meet and discuss with our advisor, Richa Panjabi, who gave us advice on how to approach the integrations efficiently. This allowed the team to receive help when we had our share of troubles during the development phase. In the middle of the development phase, around week 7, we had a mid-project presentation where we held a meeting with our advisor indicating where we were at with the project and our approach on completing the

website. Through this presentation, we decided that we would cut down some of the requirements, such as stretch goals and the iteration to focus on the core aspect of the project.

After each iteration, we would meet up with the client and client proxy, where we would receive feedback from each iteration of the development that we would demonstrate. The client will then either accept or give us feedback on what they would have liked to see on the website. If there were any additional requirements from the meeting, the Project Manager would talk to the developers, deciding whether it would be achievable.

A document would then be sent to the client, to be signed off to confirm that they have agreed with the demonstrated product.

## CONCLUSION

We thoroughly enjoyed the experience and worked well as a team.

# RDANZI Web & App System

**Team:** Piyush Sharma, Chandan Waila, Uriah Twohill & Gautam Mehta

**Advisor:** Dr Abdolreza Hajmoosaei

**Client:** RDANZI - Michele Holah

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## INTRODUCTION

*Roller Derby Association of New Zealand Incorporated (RDANZI)*, is the organisation responsible for organizing Roller Derby events throughout New Zealand. The goal of this project is to create a web-based application for event booking system that allows users to assign, create and manage roller derby events, rosters of volunteers for the events, and User Game Histories.

Currently, there is no booking or roster system for RDANZI. Volunteers are organized by word of mouth and private message groups. Genius CPU'S have set out to create a fix for this problem.

## DEVELOPMENT

Within the development phase, Genius CPU's have used the Kanban methodology. This includes the use of a 'Kanban Board' from JIRA software to track tasks, scope, and requirements dynamically throughout the project with the goal of staying on track with the estimates set out in the Gantt Chart created at the start of the project.

We have used Visual Studio to develop the Application for our client using the ASP.NET MVC framework. To create the backend (or inner functionalities of the application), we have chosen to use C#, HTML, jQuery, JavaScript, SQL Server, and CSS for all the development.

We also tested the Web Application to ensure that it can support multiple users at once as demonstrated

by stress test cases to ensure the steadiness of the application. As well as this many other manual and unit tests were carried out on the application to demonstrate the functionalities that have been fulfilled, this ensures the user's requests are processed safely through the network and created as per the client's requirements.

Along with this, we have held regular meetings with the client to discuss the scope and requirements needed for the application. This included regular demonstrations to the client as the application was developed.

## CONCLUSION

The project is working, and most of the requirements have been met, we have also produced an application summary document that describes the current state of the application, what functionalities were and weren't met, as well as problems we encountered during development and advice on where to start for any project team that decides to take this project on in the future for further development.

As requested by the client the features and functionality are user-friendly and provides the requirements for all volunteers to create and manage events and their rosters, as well as keep track of the history of the games that users have volunteered at. As well as the basic user functionalities, we have also achieved a good amount of Administrator functionalities that will give them more control over the application and the database.

# RESEARCH SELECTION EXPERT SYSTEM

**Team:** Avneet Kaur, ~ Rohan, Jaideep Singh and Dhinakar Loganathan

**Advisor:** Manish Singh

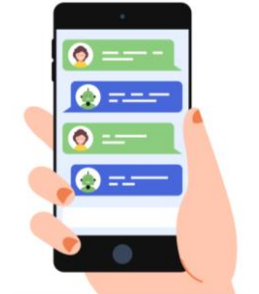
**Clients:** Chalinor Baliuag, Julia, Robert Sutcliffe



Introduction



Chatbot Development



Developed Chatbot

## INTRODUCTION

*Research Selection Expert System* is a project to develop four IBM Watson Assistant or Chatbots for WelTec's Management. Our team has four members and each team member developed an individual chatbot.

Details of chatbots:

**Chatbot for Project Selection:** Our first Chatbot is for project students to find a project of their interest. Developer: Dhinakar Loganathan.

**Chatbot for Research Topic Section:** Second Chatbot is for research students, to help them in finding a research topic of their interest. Developer: Jaideep Singh

**Chatbot for BIT Eligibility Check:** Third chatbot is only for BIT students to check their graduation eligibility, they can check if they are eligible graduate in particular majors or not. Developer: ~ Rohan

**Chatbot for Enrolling in Graduate IT programmes:** Fourth chatbot is to help students before enrolling in Graduate IT programmes. Developer: Avneet Kaur

The management/reception staff spends so much of their time in answering students queries. So these chatbots would help them to save their time and would also be helpful for students.

## DEVELOPMENT

**Demo:** Before the development of these four individual chatbots the client's requirement was to make a demo. So we prepared a demo chatbot for WelTec free bus service and then we were allocated with four different topics.

All the chatbots are developed with AI, by using the tool IBM Watson Assistant. The same process is followed for the development of each chatbot. We followed the IBM course methodology to develop these chatbots, which is similar to Waterfall methodology.

Requirement gathering, the first step, we collected the requirements from client first. We worked on four different products so we dealt with clients individually and all the chatbots are for students so the students requirements were also gathered with a questionnaire.

According to the requirements, we created the four watson assistants. In the design process we used analysed data collected through questionnaire and also provided by client. Three main elements used to create chatbots are: intents, entities and dialogs.

After the development of chatbots, the chatbots integration was done with a dummy website just to show it as a sample for client.

Lastly, testing of the products is done at its preview link. All the functions of the chatbots are tested.

## CONCLUSION

These four chatbots are for four different purposes. So with the use of these chatbots Management team can save their time and students can select the project of their interest, research student can find the topics of their interest, BIT students can check their eligibility of graduation and students who wants to get admission in Graduate IT programmes at WelTec, they can check the required information with the help of one of our chatbot.



# RFID Tag in a Laundry Business Operation

By: Pardeep Kaur

Advisor: Dr Fahimi Ali

## Case Study

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Pardeep Kaur



RFID Tag scanning



RFID Tag stitching

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## PROJECT SCOPE

The project focused on the inventory management as the dispatched linens are not returning to the laundry. This is due to expected loss of the linens that are not returned.

The objectives of this project are:

RO1: To explore the inventory management using RFID

RO2: To find out the RFID tag costing

These objectives were guided by the following project research question(s):

RQ1: What is the cost of using RFID tags on laundry items to reduce loss of items?

RQ2: How RFID will work for them and help to reduce or eliminate loss of items?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic area includes inventory management strategies, RFID inventory control system, supply chain using RFID and optimization of laundry workflow using RFID.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research question, a secondary data collection method approach was used. The data was collected through peer-

reviewed articles to analyse the implementation process and e-commerce website for pricing.

Data was analysed using charts, tables, graphs, and statistics.

It was found that implementing RFID will help the laundry business to manage their inventory and loss to the inventory.

The findings are expected where it is like the literature.

Based on the evidence found from the findings, it was recommended that in short-term, the host may need to train their staff about how to use it as well as they need to pay regular attention towards the tags life. Moreover, it is advisable to buy their own software so that it will be more convenient for the organisation.

In long term, the laundry business may implement these recommendations; buying own hardware to save the rental cost of the hardware.

## CONCLUSION

In summary, this project recommended four short-term and long-term recommendations based on the evidence found through a secondary data collection method.

The recommendations have helped laundry businesses in some way to solve their inventory management and losing issue and to guide them to plan for their business direction in future.

# SADHANA CARD

**Team:** Madar Shaik, Chirag Sitapara, Jay Gandhi

**Advisor:** Sandeep Vankadari

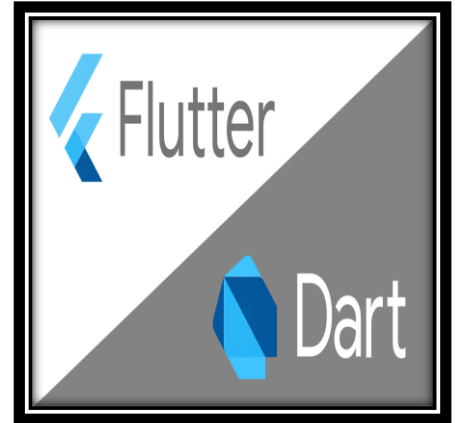
**Client:** Amit Bahamare



Sign In or Sign Up Page



Main Screen- Dashboard



Tools & Language

## INTRODUCTION

Sadhana Card is a Mobile Application developed to help the devotees of Lord Krishna connect under ISCKON Culture for Education. It helps devotees to track their devotional practices and participation in devotional events by converting that into points, based on the time and activity entered by devotee. It gives a progress report on monthly, quarterly, or annual basis. The Project was developed by a team of three IT graduate students and they named their team MCJ Consultants.

Devotees can update or add what they have done. Sadhana Card can remove the need of hard copies to maintain activity records. Whether they are in employment, a student, or a preacher, it will be useful for all.

## DEVELOPMENT

Sadhana Card is a mobile application and there are several tools and languages that can be used. After a research as per the current market standards we chose 'Flutter'. Flutter is an open source UI software development tool used to develop mobile applications for Android, ios and other platforms from a single codebase. 'Dart' was the code used in application development.

The team created a development plan using Agile Scrum software development methodology. The method the team used was to divide work into three sprints and each sprint with sprint backlogs which are allocated according to time.

The team initially created a system analysis and design plan as well as a sample of wireframe and visual design by using Adobe XD. This design was presented to the client for approval.

As tools and language were both new to the team, they utilised available resources online. As part of the development, a user interface (UI) design was

created in Flutter. The User Interface developed a Welcome screen with a mantra given by the client. The Welcome screen then redirects the user to the Sign-in/Sign-up page with a reset password option. Upon successful sign-in it redirects to the Dashboard screen which consists of several activities such as: chanting, reading, listening and other services. Chanting activities develop three sliders which represent different time slots. Reading, hearing and other services will each produce two sliders, representing time in hours and minutes and a free text box to enter the details in brief.

This is then followed by the User Interface. Development of the database was attached in the back end. The database was created on SQ Lite using Flutter. This database created three tables for login, points, and daily reports. These tables help to store the data entered by the users.

After successful completion of the database, the application was sent for testing to identify the development-based errors. In Phase 1 the team completed functional testing and checked all the data input by user stored or not. Several other tests were performed to eliminate runtime errors. When all the steps were fully tested, an android-based mobile application *Sadhana Card* was developed.

## CONCLUSION

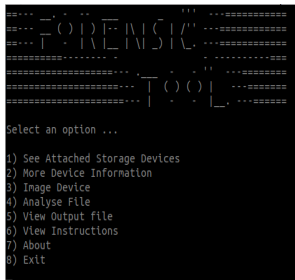
The project team of "Sadhana Card" followed best practice to achieve the best outcome. For a successful app, the team followed the proper development process including requirement gathering, design, development, testing and launch. The application, *Sadhana Card* was developed as per the client's requirements and is now ready to launch.

# Security Project

**Team:** Blake Larson, Vrajesh Choksi, Dalvir Singh and Yousuf Hassen

**Advisor:** Scott Morton

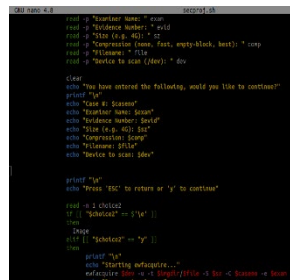
**Client:** Dr Dax Roberts



```
=====
T O R E N S I C
=====
Select an option ...

1) See Attached Storage Devices
2) More Device Information
3) Image Device
4) Analyse File
5) View Output file
6) View Instructions
7) About
8) Exit
```

CLI Menu



```
#!/bin/bash

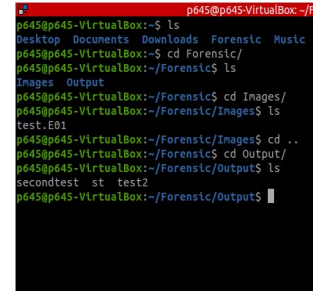
# Variables
dev="sda"
size="1000"
loc="/dev"

# Functions
img() {
    echo "Imaging $dev to $loc/$dev.img"
    dd if=$dev of=$loc/$dev.img bs=1M
}

analyse() {
    echo "Analysing $dev"
    # ...
}

# Main
img
analyse
```

Example of script (nano)



```
p645@p645-VirtualBox:~/Forensic$ ls
Images  Output
p645@p645-VirtualBox:~/Forensic/Images$ ls
test.E01
p645@p645-VirtualBox:~/Forensic/Images$ cd ..
p645@p645-VirtualBox:~/Forensic$ cd Output/
p645@p645-VirtualBox:~/Forensic/Output$ ls
secondtest st test2
p645@p645-VirtualBox:~/Forensic/Output$
```

File Structure

## INTRODUCTION

This project is a proof of concept to look at the feasibility of a Forensic tool to automate the process of imaging a device and then analysing that image.

Due to the nature of the concept, the scope for this project has been variable and a large part of the process has been identifying a starting point for its development.

## DEVELOPMENT

This project was developed using Linux CLI commands and shell scripting.

In the first instance a bash script was made which was then extended to include functions and built on from there.

Most of the coding and development was learned during the process.

The CLI tools that were used involved research and after discovering and selecting the ideal tools it was clear that remaining with a Linux OS was the best choice for this project.

Initially the plan was to create three components, a front end, a working automated script (or scripts) and a backend database. After having created a web front with ASP.NET core we put this on hold for future iterations as we did not have the time or expertise to integrate it.

The database was created using MySQL and PHP, again, this is something that will need to be more fully integrated in future iterations but for now it does the basics such as storing image files, and that is a start.

Most of the work was done on a PC using a Linux virtual machine, although towards the end of the project we had access to a physical machine with a large storage device.

## CONCLUSION

The result of this project is a robust and thorough shell script that can do everything the client has expressed, the command interface is practical and acceptable for its use.

The script itself is portable but only within Debian systems, although not many changes would need to be made to update it to another Linux distribution.

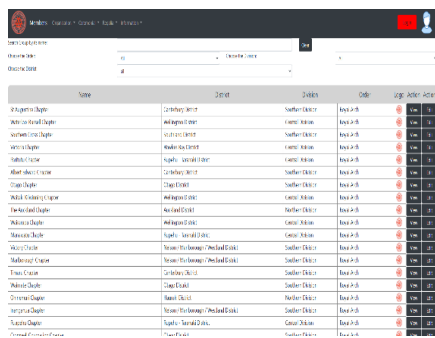
Due to the explorative nature of the process, as well as the script, we have developed a detailed set of operating and installation instructions as well as recommendations for future development.

# SGRANCNZ 2020 – ADMIN WEB PORTAL

Team: Jack Shiltsov, Andrei Tatarov and Leem Dmello

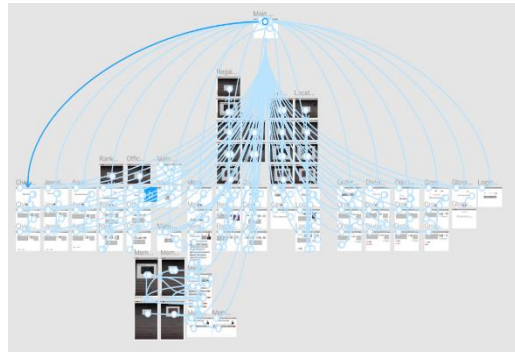
Advisor: Adrian Hargreaves

Client: Ken Burt

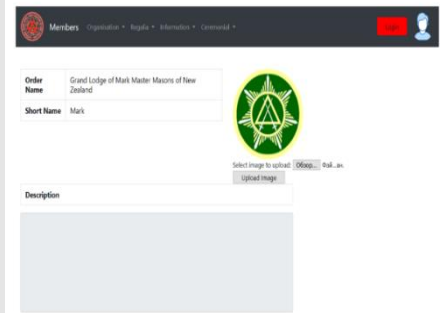


Name	Division	District	Code	Page	Admin	Active
1st Lodge	1st Division	1st District	1000-01	1000-01	1000-01	1000-01
2nd Lodge	2nd Division	2nd District	2000-02	2000-02	2000-02	2000-02
3rd Lodge	3rd Division	3rd District	3000-03	3000-03	3000-03	3000-03
4th Lodge	4th Division	4th District	4000-04	4000-04	4000-04	4000-04
5th Lodge	5th Division	5th District	5000-05	5000-05	5000-05	5000-05
6th Lodge	6th Division	6th District	6000-06	6000-06	6000-06	6000-06
7th Lodge	7th Division	7th District	7000-07	7000-07	7000-07	7000-07
8th Lodge	8th Division	8th District	8000-08	8000-08	8000-08	8000-08
9th Lodge	9th Division	9th District	9000-09	9000-09	9000-09	9000-09
10th Lodge	10th Division	10th District	10000-10	10000-10	10000-10	10000-10

Design of the web-portal



Structure of the portal



The screenshot shows the 'Details of the edit mode' for a lodge. It includes a header with the lodge name 'Grand Lodge of Mark Master Masons of New Zealand' and a logo. Below the header, there is a form with fields for 'Order Name', 'Short Name', and 'Mark'. There is also a 'Description' field with a text area. At the bottom, there are buttons for 'Select image to upload', 'Upload image', and 'Save'.

Details of the edit mode

## INTRODUCTION

This Project was focused on design and creation of a fully functional Web-portal for the SGRANCNZ's database. For convenience work has been done so that changes to existing data and creating new data when required can be undertaken.

During meetings with the client, the view of the application was arranged, as well as the composition of the pages and their content. Then the wireframes and the prototype were developed.

Each stage was followed by a discussion with the client. Comments and corrections were applied after each phase. After the final approval of the prototype from the client the development phase started.

## DEVELOPMENT

To implement the project, it was necessary to complete several stages:

The first is the site map and a prototype, for this, the Visio and FIGMA programs were used. This made it possible to arrange and display the content of webpages. All the links between the pages were established, as well as their output.

During the developing part of the Web-portal, the following stack of technologies were used: HTML and CSS (with Bootstrap) for an attractive view of the pages.

PHP was the main programming language for connections to the existing base, which is in MySQL. In addition, JavaScript filters were implemented to correctly display search pages and provide to the client better experience while working with many items on the search page.

Currently the connection with database of all main pages are established, and content can be sorted by order, division, district, or all together, as well as search field can be used for filtering the content as well.

## CONCLUSION

The project was interesting to work on and many new skills were added to our portfolios. We had a lot of satisfaction in being able to have all the database pages configured as the client, Ken Burt wanted them set out and as we envisaged them. Throughout the project we worked as a cohesive team.



# SGRANCNZ 2020 - REST APIs

Team: Gellio Gao and Louise Zhang

Advisor: Dr Waqar Khan

Client: Ken Burt

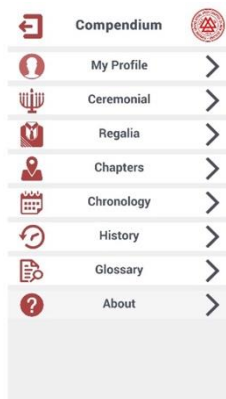
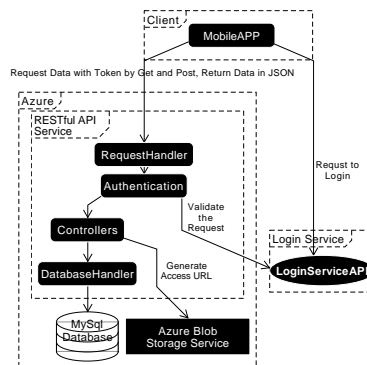
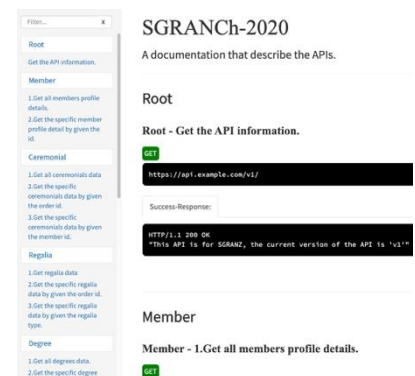


Image of the application



System Architecture Flowchart



apiDoc Documentation

## INTRODUCTION

The Supreme Grand Royal Arch Chapter of New Zealand (SGRANCNZ) Compendium mobile App was originally created by previous teams. Its goal was to provide authorised members of SGRANCNZ with offline access to the resources of the SGRANCNZ Compendium. However, this app could not read data from database.

Therefore, this project was developed for Representational State Transfer (RESTful) APIs using a (Linux, Apache, MySQL, and PHP) LAMP stack that accepts requests (calls) from the mobile app, authenticates a user, and provides a JSON response to the request. The APIs were built in Lumen framework which is a PHP micro-framework for building lightweight APIs that use HTTP requests when handling data. The project's goal was to ensure SGRANCNZ Compendium App can be synced with the most recent data from database and all functionalities can be accessed by current SGRANCNZ members, while being offline, to be reconciled when going online.

## DEVELOPMENT

The project team used the Scrum Methodology throughout the project life cycle. Each sprint had an analysis, design, development, testing and delivery phases.

The project started with gathering requirements and client expectations. As a result of this, the team submitted a proposal with a plan of action to follow SCRUM and organise the development sprints and tasks.

After the proposal was granted approval, the team started system analysis and researching development techniques that could be used. The research helped to determine that the Lumen Framework and a LAMP stack would be the best fit options for building lightweight APIs.

After setting up the development environment, the team created system architecture and API list. This was an important step as it helped to ensure that the client expectations were met.

During the development stage, when a milestone was reached, testing was also done in parallel using Postman to keep a consistent workflow. As a team all code was merged using Azure DevOps and then progressed to the next sprint.

Lastly, the final documents were completed and compiled in technical documents format which could be used for future developments.

## CONCLUSION

The team members used the essential skills of project management to maintain the relationship with the client and to carry out the process within the team.

The team compiled all recommendations and heavily documented the source code to make sure any party who may continue with the development have a good knowledge base to work with.

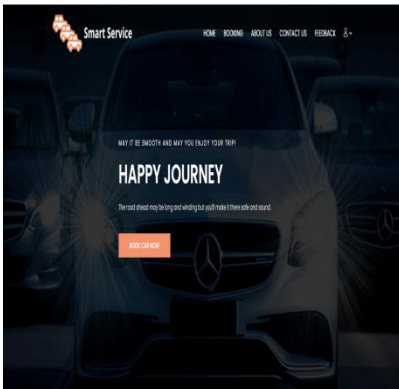
The team completed the project and gained a good learning experience and increased skills.

# SMART SERVICE BOOKING

Team: Keval, Vinith, Kevin

Advisor: Thi Thu Trang Do

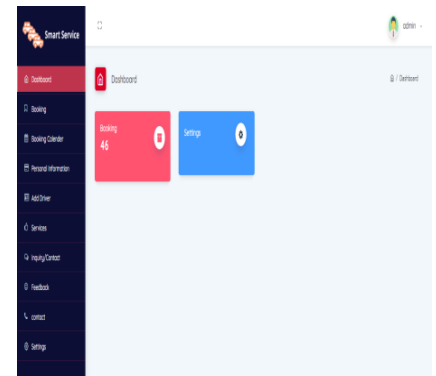
Client: Robert Sutcliffe



Home page of User view



Logo



Homepage of Admin view

## INTRODUCTION

Currently, there are many websites or applications for driving booking services available. For example, 'Uber' and 'Easy Booking'. These websites do not provide appropriate disability service or a pre-booking service. In comparison, 'Smart Service Booking' has a focus on the user or customer and a driver's flexibility.

*Smart Service Booking* will have some supporting services for customers such as email confirmation services, notification services, feedback function, and enquiry form. This project aims to provide comfort for people by offering more facilities such as mobility, advanced booking for the user, and slot booking for the specific time.

## DEVELOPMENT

The development of *Smart Service Booking* website started by gathering requirements from the Client. We then looked for the best methodology and approaches from project management. We decided to use 'V-model', RACI chart, Gantt chart, WBS for developing the Smart Service Website.

After deciding on the tools and methodology, we started the system analysis and designing to improve functionality and interface between user and system. We created Prototyping, storyboarding, wire-framing, UML diagrams. In the next step, we started to install software for developing the *Smart Service Booking* and we

separated the project into two parts, user side and admin panel.

Firstly, we created a home page design for the user and continued to develop the user side followed by the admin side. We encountered some errors during the development and some components such as the booking calendar and email notification were not easy to implement.

In the testing phase we investigated automated testing and found this takes a considerable amount of time and we therefore decided on manual testing.

Throughout the progress of the project, we consulted with the client and advisor and had regular meetings with the advisor and client to review design and documentation of the project.

We were able to successfully complete the project.

## CONCLUSION

We did our best to complete all functionalities and features of the website, as per the client requirement. We developed advance booking, additional support for user, email notification, feedback function and inquiry form.

# SOFTWARE DESIGNED STORAGE

**Team:** William Edmeades, Jesse Beatty-Ward, Vincent Cherry

**Advisor:** Sandeep Vankadari

**Client:** Paul Bryant



Wellington Institute of Technology



Ceph Storage



Ceph Community Contacts

## INTRODUCTION

The Wellington Institute of Technology (WelTec) has an opportunity to improve storage availability and access for students and staff. WelTec wants a solution to better manage the current storage situation within the B-block of the Petone Campus. Currently student storage is local to each machine within the B-block, this causes drawbacks to students that must work on different workstations as files are not accessible unless copied over the network. Multiple instances of the same student data across multiple workstations creates unnecessary duplications and use of storage that could otherwise be harnessed elsewhere.

Project Team Alpha proposed a Software Defined Storage (SDS) solution and chose Ceph Storage as the vendor of choice. While Ceph does have enterprise variations to the product software it is available at zero cost as a community version, with full functionality and an active community that is dedicated to its development.

## DEVELOPMENT

The first stage of development that we undertook was the selection of an appropriate SDS vendor. We unanimously concluded that Ceph Storage ticked most of the boxes, it was opensource, well supported and highly praised as an SDS solution.

Understanding how Ceph operates was not too difficult, we quickly grasped the basics and jumped headfirst into creating a working test cluster. Our environment was designed around the minimum recommended requirements, those being three storage nodes and one admin node (node being

host). Ubuntu 18.04.4 was used as our distribution of choice due to familiarity, we did not want to spend time learning a different distribution.

Once we had an operation Ceph Cluster we then investigated utilising block storage functionality for Windows 10 clients within WelTec's B-block. iSCSI the obvious choice for delivering the block images to the Windows 10 clients, however we were not happy with the hoops that one had to jump through to get communication occurring. The iSCSI gateway was a single point of failure that could be detrimental to WelTec's Windows environment.

Thanks to the help of our client we managed to discern that there was development being made toward a Windows-Ceph port. This port gave Windows clients access to the Ceph Cluster without having to use iSCSI as a middleman. We jumped on this opportunity and managed to get it working with our cluster, B-block Windows 10 clients could store and use data as if utilising a traditional HDD.

The Windows-Ceph port was only made possible due to the bright minds at SUSE and Cloudbase Solutions as well as those involved in the Ceph community. Without their achievements we would not have been able to implement what we did.

## CONCLUSION

Ceph is a fantastic SDS concept, it has a high learning curve and is worth the effort. As our project was a proof of concept our project team looks forward to learning more about Ceph and hope our documentation contains information that can be developed upon in the future.

# Strandbags' Brand Awareness and Product Variety

By: Aira Luna

Advisor: Dr Fahimi Ali

Host Organisation: 2 Strandbags



Aira Luna



Strandbags

## PROJECT SCOPE

The project focused on the importance of brand awareness and product variety of *Strandbags*. This is due to the company not having a strong brand awareness and the company losing sales because there are limited products in the store.

The objectives of this project are:

RO1: To find out what social media marketing strategies Strandbags can use to increase brand awareness and how brand awareness influences the sales of Strandbags

RO2: To examine how product variety affects the customer purchase decision

These objectives were guided by the following project research questions:

RQ1: How can the use of social media help Strandbags to increase their brand awareness?

RQ2: 5.2. How can product variety improve the sales of Strandbags store in Queensgate?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic area includes social media marketing, consumer behaviour towards online purchasing, and product variety.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research question, a primary quantitative approach was used. The data was

collected through a survey. 147 surveys were collected.

Data was analysed using charts and graphs.

It was found that consumers' purchasing decisions are somehow influenced by social media marketing. Most consumers prefer to shop in-store when purchasing handbags and suitcases although online shopping is on the rise. Consumers prefer to see and touch the item first before purchasing them. Consumers also prefer to see a wide range of options when looking for handbags and suitcases.

The findings are expected where it is like the literature.

Based on the evidence found from the findings, it was recommended that in short-term, the host may localise the Facebook page of the company, give out discount codes that will only work at the local branch, and give special discounts for consumers who are studying and working.

In long term, Strandbags may implement these recommendations; new inventory management system and showing current stock levels of each stores on the website.

## CONCLUSION

In summary, this project recommended five short-term and long-term recommendations based on the evidence found through a mixed data collection method.

The recommendations have helped Strandbags in some way to resolve their issues and to guide them to plan for their business direction in future.

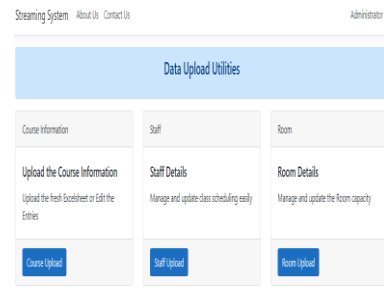
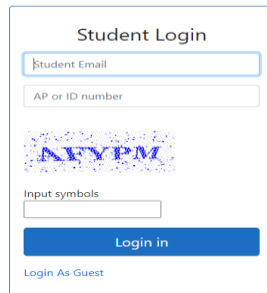
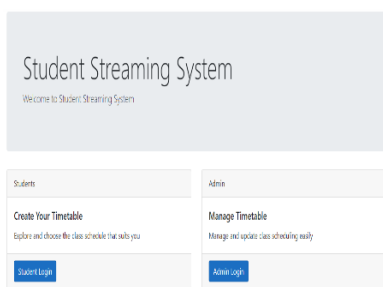


# STUDENT STREAMING SYSTEM

**Team:** Mohammad Ansari and MJ Choi

**Advisor:** Dr Abdolreza Hajmoosaei

**Client:** Glynis Valli, Robert Sutcliffe



Home Page serving all modules

Login modules for authentication

Data Import Utility to get Excel into DB

## INTRODUCTION

Current WeITec timetable system does not provide options for users to explore timetable combinations or to check remaining stream capacity. The system also displays other courses irrelevant to an individual student's study programme.

*Student Streaming System* is a dynamic web application that allows users to experiment with course selections without having to log in. Selected courses will then be displayed in a calendar form, showing remaining stream capacity and display warnings for the students. Other key features of this system include dynamic data display, increased security using reCAPTCHA, visual indicators, and additional printing and email notification functions.

## DEVELOPMENT

The project was started by gathering system requirements from the client. Based on the functionality requirements gathered, the team worked on assigning responsibilities and creating a plan of action to follow, including RACI and Gantt charts.

The team then analysed what the system should do, and requirements specification was documented. Once system analysis was completed, the team focused on designing the system and how we were going to achieve them. This included creating prototypes for the user interface of the application, allowing the team's understanding was on the right track with the client's requirements.

After system analysis and designing components were completed, the team started the development phase by working on coding and implementing features to the system.

Initially, this project was developed using the ASP.NET Core MVC framework and Microsoft SQL Server database management system but the team had issues with extracting data from spreadsheet using ASP.NET Core. As a result, the team has decided to use the ASP.NET MVC framework and was able to overcome the problem.

Combination of both Waterfall and Agile methodologies were used to develop this project. The team realised that the major problem we experienced was caused by following the Waterfall approach. Once we realised this, we decided to adapt to Agile methodology and focus on deliverables. From there on, we divided our tasks differently.

One focused on the documentations, such as the training manual and the testing, while the other continued to work on building more features to the system, which worked out better.

## CONCLUSION

Apart from learning and developing new skills while carrying out the project, the team has learned the importance of having good communications and how it contributes to team collaboration. Although the team faced many obstacles, this project made us work more closely as a team to achieve our common goals.

# STUDENT STREAMING SERVICE

**Team:** Ben Pickering, Cris Amara, Prakash Chhetri, Linus Sison

**Advisor:** Ian Hunter

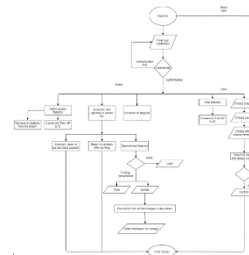
**Client:** Robert Sutcliffe



#1 SSS Login Screen



#2 The NPPN mascot, Phantayle



#3 System Flowchart

## INTRODUCTION

*Student Streaming Service* is a web-based stream selection application that enables students to choose their courses and streams (classes), then view their timetable. This removes the burden of tedious manual data entry, saving both time and money for the Wellington Institute of Technology. The stream selection application also ensures that students are enrolled with the correct number of courses for the trimester whilst eliminating any possible conflicts in their chosen schedule.

The application will need the student to register with their student ID and a valid email address and will be able to print their selected papers and streams once confirmed. A guest login is available for potential student applicants which allows them a view of possible timetables for the trimester. Some extra functionality also ensures that resources such as room capacity and student capacity are applied correctly.

The Institute's current timetabling system is a blend between a paper based and online system. The students will need to see the administrator to choose their streams for their labs and lectures, by registering their student ID on a sheet of paper representing the stream. The administrator will need to transfer this to their system for safekeeping. The online timetabling function is currently only designed for displaying which tutor and class is assigned to which room and when.

## DEVELOPMENT

The project came about as the need to have an efficient stream selection system that is vital for the efficient function of the institute. The team consists of a project manager and three developers, each focusing on a different core aspect. The team went through the project bidding process and presented a formed business proposal to the client. This included requirement lists and milestone dates that the team has agreed to with the client. Once the proposal was

approved the team began the SDLC process and started to develop systems analysis and design documentation. This is so the NPPN team and the client can both have a clear picture of the

scope/functionality of the application based on the client's requirements.

The front-end language used was React JS as it is very agile and adept at user interface development. PHP is utilized for the backend as it is flexible in interacting with different database languages. MySQL is the database used as it is free and easy to use.

The team used the Kanban methodology, to have a visual representation of how the development is progressing. The team held regular meetings either physically or via Discord. Discord was a great tool during the development process as it allowed a switch to work from home when COVID-19 came knocking. Team communication was very open during the whole process and that made task completion much easier. Weekly meetings were held with the team advisor. These meetings gave us essential guidance about where the team should be and what we should be focusing on moving forward.

The team encountered many challenges in the development of the streaming service such as the importation of the spreadsheet to the database proved to be quite challenging. Connecting the backend to the frontend was a challenge as there were huge changes that had to be made to the code to support integration. The NPPN team also struggled with individual reporting over the process, however we attribute this to a heavy focus on development.

## CONCLUSION

In conclusion the Student Streaming System is a promising development to the daily function of the institute and will undoubtedly enhance efficiency when complete as the current timetabling system is prone to human error. Over the course of the trimester, NPPN has been developing the service, however as the trimester draws to a close and handover gets nearer the list of requirements agreed on with the client remains incomplete. If the team were to repeat the process with the knowledge we have now, this would not be the case.

# The Mountain

Team: Harry Lynch, Harry Atkinson and Zaq Muru

Advisor: Susan Scott

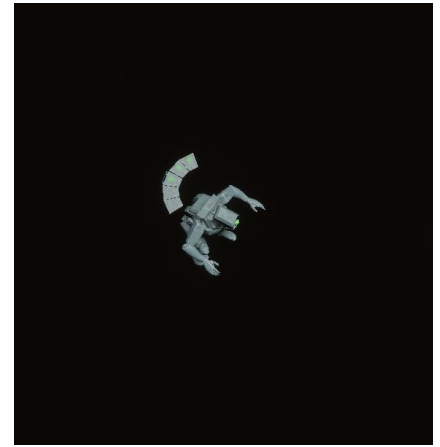
Client: Self-Client



This robot is ready for adventure!



Not all robots are so lucky though...



Sometimes things don't go as planned...

## INTRODUCTION

*The Mountain* is an adventure-themed video game that we have created using Unity. You play as a robot that is sent into an unfamiliar environment with no comprehension of a goal besides a marker on your map. You can walk, run, climb, and jump but all of this uses your precious resource: energy. Energy is your lifeblood in this game; without it, your robot cannot function.

One of our group members, Harry Atkinson, had the idea for this game a year ago after doing a course on game development. He was very excited to create an adventure game that was both visually stunning and realistic. While the other two members, Zaq Muru and Harry Lynch, both felt the same way about creating the game as he did, our demo is not quite as stunning as we had imagined. We did not let that stop us though, and we planned to continue development until we have made what we imagined, our reality.

## DEVELOPMENT

The first few weeks of our project were centred around getting the idea of what we wanted into our heads. We also had a meeting with a professional animator, Mark Tobin, who was going to help us create a robot. Then, of course, there was the documentation.

Next, we started development of core mechanical systems, such as general movement, climbing, the energy management system, and started the very lengthy process of creating a map.

The following weeks were about fleshing out what we had currently created. We made an extensive UI system (many thanks to our photoshop wizard Harry Lynch), added some audio, and created some stunning visual effects.

The next main thing we had to do was to piece everything together, which we learnt was sometimes easier said than done. However, we did get it done, and emerged with a system to save and load the game, a script which manages all the weather effects, and a system which integrates the climbing and movement systems.

## CONCLUSION

Although not in line with our top-quality next-generation expectations for what the game would include in terms of graphics or mechanics, we are very proud of what we have created and all that we have accomplished. We are all avid gamers ourselves and have always dreamed of being game designers, wondering what it would be like to develop our own game. Now, we are fortunate enough to know. Even if the demo we created in 13 weeks is not the same as what EA pays hundreds of people to create in a year, our dreams still came true, and we have made a game that is entirely our own.

We hope that you enjoy playing it as much as we did creating it.

# Tools and techniques to minimize the inventory shrinkage in Narayan Spice 'n Food Ltd

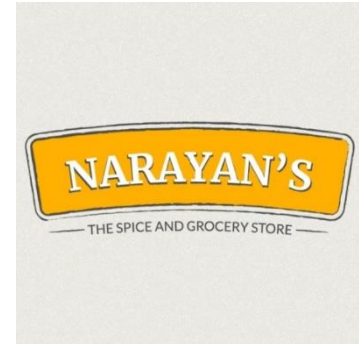
By: Hardikkumar Sutariya

Advisor: Dr Fahimi Ali

Host Organisation: Narayan Spice 'n Food Ltd



Hardik Sutariya



## PROJECT SCOPE

The project focused on inventory loss due to theft and wastage and the reasons and probable solutions to prevent inventory loss in the future.

The objectives of this project are:

- RO1: to identify any loopholes in inventory shrinkage in the retail food store
- RO2: to provide effective solutions for smooth business operations

These objectives were guided by the following project research question(s):

- RQ1: How Narayan Spices n Food can use tools and techniques to measure and monitor their inventory to reduce loss due to theft and wastage
- RQ2: What are the risks associated with poor inventory management?
- RQ3: How does the efficiency and consistency in inventory management improve the performance of business?

To have an in-depth perspective and current knowledge of the project, a comprehensive review of the academic literature was conducted. Some of the topic areas includes theft and characteristic of products, use of IT to reduce theft, RFID in stock management, and inventory control strategies.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the project research questions, a mixed method approach was used. The data was collected through two global and two regional retail shrinkage reports, one in-depth face-to-face interviews were

conducted, and a one-week onsite audit has been conducted.

Data was analysed using charts, graphs, and pivot table. It was found that retail shrinkage is between 1 to 2%. Internal employees and shoplifters are the key source of retail inventory loss. The findings are expected where it is like the literature on retail shrinkage.

Based on the evidence found from the findings, it was recommended that in short-term, the host may install public view monitoring screen to control shoplifting, use of social media to attract customer and promote product at discounted prices, and increase cycle counting for reconciliation of stock.

In long term, the Narayan Spices may implement these recommendations; food wastage audit to prevent wastage, POS data analytics to make an informed decision on order quantities and reconciliation of stock.

## CONCLUSION

In summary this project recommended four short-term and three long-term recommendations based on the evidence found through a mixed data collection method.

The recommendations have helped Narayan Spices in some way to solve their inventory shrinkage due to theft and wastage, and to guide them to plan for their business direction in future.

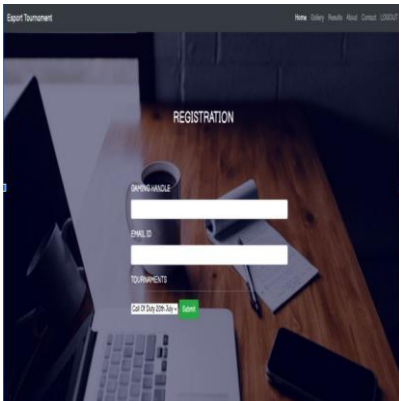


# TOURNAMENT MANAGER

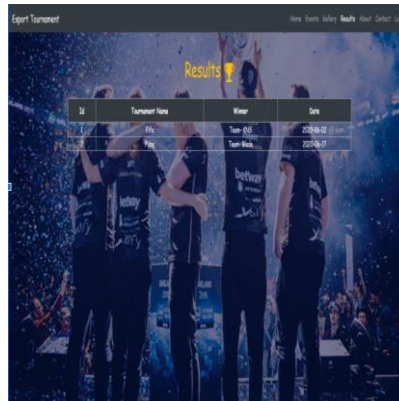
**Team:** Preet Karan Singh Bhandari, Mohd Gufranshoeb Kasmi, Harpreet Singh

**Advisor:** Ian Hunter

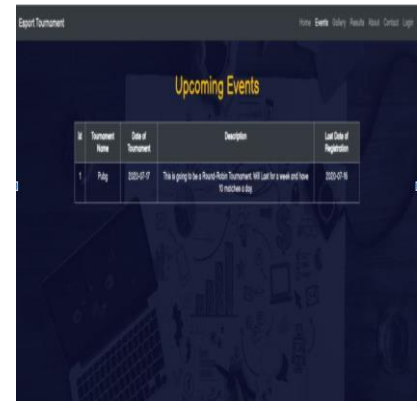
**Client:** Robert Sutcliffe



Tournament Registration Page



Results Page



Upcoming Events Page

## INTRODUCTION

Throughout the recent years, the world of e-sports or competitive gaming has grown significantly; but still the industry itself is not as new as many believe. E-sports is the practice of playing video games competitively, usually over the internet or through networked computers at events. Participants perform either individually or in teams and compete to win prize rewards. Our clients told us to build a website for the students of WelTec where they can participate in different types of tournaments.

*Tournament Manager* is a website where all the students of WelTec can easily participate in different kinds of tournaments by registering themselves. Students can see the results for every tournament as well as the list of all upcoming events.

Clients can easily modify or update all the details of registered users and events as well by using the admin panel. Admin can modify the information of any user, tournaments, gallery photos, results, user queries, and upcoming events list.

## DEVELOPMENT

We decided to develop a website which can help the students of WelTec by participating in their favourite E-sports tournaments to showcase and improve their skills.

For this project, we have used Agile Scrum methodology where the project was developed in five Sprints starting from the preparation of project proposal, systems design, development, testing

and ended with product monitoring and deployment.

After getting the approval for the project proposal and systems design, the team started the development of the website using the PHP platform where we can make the design more customized as per client's perspective. We used XAMPP server and its built-in MySQL database environment for working on a local machine with Notepad++ as the code editor. For now, this website works on local host only as our website did not go live however it can be hosted on a domain in future.

We did the functional testing while doing the development and upon completion we did regression testing as well as performance testing. We fixed some of the errors and issues and left security of the website for future improvements.

## CONCLUSION

Our team had delivered a quality website "*Tournament Manager*" for our client with satisfactory output.

We have gained a lot of experience after working on a real time project and improved our technical skills as well as the project managing abilities which will be helpful for our future career in the IT field.

# Tournament Manager 2.0

**Team:** Amber Li, AbdulHamid Lokhandwala, Shiva Kanta Ranam

**Advisor:** Sandeep Vankadari

**Client:** Robert Sutcliffe

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## INTRODUCTION

Tournament Manager 2.0 is an e-sport organiser using an open source web application, developed to run several online tournaments, complete with online registrations to use this in conjunction with e-sports club at WelTec. The main goal of developing this web application is to associate the developed product with WelTec Sports Club. This will allow WelTec students to join and participate in esports/ tournaments organised by the admin. This web application has been designed to allow admin, with distinct features, to organise and manage tournaments whereas users can register and participate in the tournaments.

However, the current version of the web application is developed using open source tools which allows it to be modified further with additional and adaptable features as per the business requirements.

## DEVELOPMENT

The methodology used in this project was Agile Software Development Life Cycle Model which is an adaptive methodology that combined iterative and incremental processes. The reason we chose Agile is that it is designed to accommodate change and the need for faster development. In this methodology, there are six stages they are: proposal, planning, requirement analysis, designing and developing, testing, final handover.

Our project initialized with system requirements gathering, we spent a good amount of time researching and discussing the concepts of this

project as well as the suitable tools that should be used to develop the website. With a completed understanding of client's requirements, we began the design phase working on wireframe design and prototype design.

At the development phase, technologies involved were MERN (MongoDB, Express, React and Node) Stack and GraphQL. This phase is divided into two major parts:

- Front-end Development: Using HTML, CSS and React. to represent the user interface and functionalities of the application that the end-user interacts with.
- Back-end Development: Using Express, Node.js and MongoDB to setup server and database. Using GraphQL for simple data fetching.

At the testing phase, user acceptance testing was successfully conducted. Users were asked to fill a survey form with critical application functionalities.

## CONCLUSION

Tournament Manager 2.0 is developed and completed on time by meeting all the client's requirements in the project and the final product has been approved by the client. The project documentation provides the detailed information of the system design, development details and testing survey. The team trio has learnt a lot during the development of this project and we enjoyed the teamwork and meeting the challenges.

# Validation of IPv6 Network

Team: Lalit Dake & Vivek Panchal

Advisor: Paul Bryant

Client: Jeffry Echano

Validation Of IPv6 Network - Audit List					
Device	Device Details	Location	Operating System	Hardware Platform	Dual-Stack Compatibility
Switch	b101-s14	B101	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b102-s1	B102	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b103-s1	B103	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b105-s1	B105	Cisco IOS 12.2(53)SE1 (LANBASE)	C2960 Stacking	Verified and Compatible
Switch	b106-s1	B106	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b107-s1	B107	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b108-s1	B108	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b202-s1	B202	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Switch	b203-d1	B203 Rack P	Cisco IOS 12.2(58)SE2 (UNIVERSALK9)	Cisco 3560E	Verified and Compatible
Switch	b203-d2	B203 Rack P	Cisco IOS 12.2(58)SE2 (UNIVERSALK9)	Cisco 3560E	Verified and Compatible
Switch	b203-d3	B203 Rack P	Cisco IOS 15.0(1)SE3 (UNIVERSALK9)	Cisco 3560E	Verified and Compatible
Switch	b203-d4	B203 Rack P	Cisco IOS 15.0(1)SE3 (UNIVERSALK9)	Cisco 3560E	Verified and Compatible
Switch	b203-d2	B203 Rack S	Cisco IOS 12.1(0)E2C (K94L2)	catalyst295012	Switch Down
Switch	b203-d3	B203 Rack F	Cisco IOS 12.0(5)WC5a (CH2S)	cat3548XL	Not Compatible due to IOS issue
Switch	b203-d4	B203 Rack S	Cisco IOS 12.0(5)WC5a (CH2S)	cat3548XL	Not Compatible due to IOS issue
Switch	b204-s1	B204	Cisco IOS 12.2(53)SE2 (UNIVERSALK9)	Cisco 2960S	Verified and Compatible
Server	dc1	B203 Rack S SC1-1	Microsoft Windows Server 2008 Datacenter	Intel x64	Verified and Compatible
Server	dc2	B203 Rack S SC2-1	Microsoft Windows Server 2008 Datacenter	Intel x64	Verified and Compatible
Server	hft.soft.local	B203 Rack Q	uCisco IOS 15.1(3)T1 (UNIVERSALK9)	CISCO1941N9	Server Down

Figure 1: IP Audit List

Validation Of IPv6 Network - IP Validation List					
Device	Device Details	Device Location	IPv4 Range	IPv6 Range	Status
Switch	b101-s14	B101	156.59.41.0/24	8241::/64	Validated
Switch	b102-s1	B102	156.59.42.0/24	82c1::/64	Validated
Switch	b103-s1	B103 34	156.59.43.0/24	8221::/64	Validated
Switch	b105-s1	B105 28	156.59.45.0/24	82a1::/64	Validated
Switch	b106-s1	B106 34	156.59.46.0/24	8261::/64	Validated
Switch	b107-s1	B107 34	156.59.47.0/24		Validated
Switch	b108-s1	B108 34	156.59.48.0/24	82A1::/64	Validated
Switch	b202-s1	B202 34	156.59.32.0/24	82e1::/64	Validated
Switch	b203-d1	B203 Rack P 40			Validated
Switch	b203-d2	B203 Rack P			Validated
Switch	b203-d3	B203 Rack P			Validated
Switch	b203-d4	B203 Rack P			Validated
Switch	b203-s2	B203 Rack S	156.59.36.0/24		Switch Down
Switch	b203-s3	B203 Rack F 52			Validated
Switch	b203-s4	B203 Rack S	156.59.33.0/24		Validated
Switch	b204-s1	B204	156.59.34.0/24	8291::/64	Validated
Server	dc1	B203 Rack S SC1-1 13			Configuration for IPv6 present on
Server	dc2	B203 Rack S SC2-1 13			

Figure 2: IP Validation List

## INTRODUCTION

The School of IT and Business at the Wellington Institute of Technology (WelTec) has its own computer network and both the IPv4 and IPv6 are configured across this network. Since IPv6 schema was developed and deployed, additional lab space was allocated to the School. It was unclear whether the IPv6 schema was extended to accommodate the change and whether IPv6 configuration was extended to the additional workstations and network devices such as hardware and iOS.

This project is about validating the current IPv6 address schema, validating and auditing the IP addresses in the use of B-Block. The project will also include testing of various network devices such as switch, router and servers. It should also result in an updated Network Topology diagram.

## DEVELOPMENT

1. Development of the project will start with auditing each network lab and checking their IPv6 address schema. Making a note of all audited devices.
2. Developing new updated network topology diagram, which will be done on Packet tracer or Visio.
3. Testing is the part of Validation of IPv6 Network, which includes a test plan and test cases.
4. Testing of all the devices whether they are configured with IPv6 address or not, if not then submit it with the solution alongside test cases.
5. Documenting strategies and best practices for validating IPv6 address range.

6. Developing an IPv6 range for new labs in B-Block and propose a new IP range.

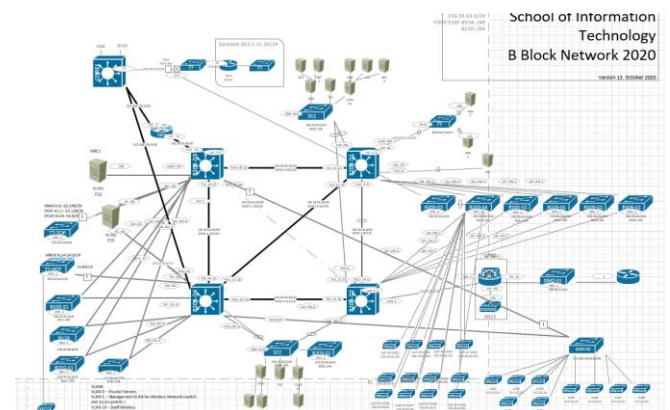


Figure 3: Updated Network Topology

## CONCLUSION

The project will conclude by meeting the forecasted deliverables, which include developing a network topology diagram, validating IPv6 network by creating a test plan and various test cases. Device compatibility for IPv6 operations will also be reviewed.

# WELLYCON

**Team:** Allen Shelly, Dhvani Patel, Amanpreet Singh, Pavel Klimov

**Advisor:** Adrian Hargeaves

**Client:** Ceedee Doyle

Play to Win Registration Page

Backhand dashboard where all the data is being stored

## INTRODUCTION

This project was initially focused as a database design project when it was handed out. However, after the initial meeting with the client the scope of the project was totally changed from database design to a website design project. The exponential growth of *Wellycon* has created administrative challenges. A series of methods have been utilised to manage administration that includes the spot meet ups and registration. We managed to produce a decent website fulfilling the functionality required.

## DEVELOPMENT

The main scope of the project was to make a system that can be used in upcoming years of *Wellycon* board game contests. We designed the website with the homepage, about us page, contact us page, and the registration page. This page has the main functionality that was required by the client. Through this page users can register themselves with the games that they played. They can also provide feedback on a game. As a result of this the person gets registered to the “Play To Win” contest.

All the data were stored in the backend dashboard can be exported into Excel which can be used in many different forms.

## CONCLUSION

Most of the deliverables were completed by the end of the project. The project gave us an opportunity to apply what we learnt over the last three years. In particular, the project gave us a ‘never say no’ attitude as it involved website development, in which none of us have much experience.

It is recommended that further iterations of this project could benefit from adding random lucky draw winners and a digital game library. Excel files can be used for data visualization techniques with populated data.

Our team enjoyed working on the *Wellycon* project and learnt a lot about working in teams and managing workloads.

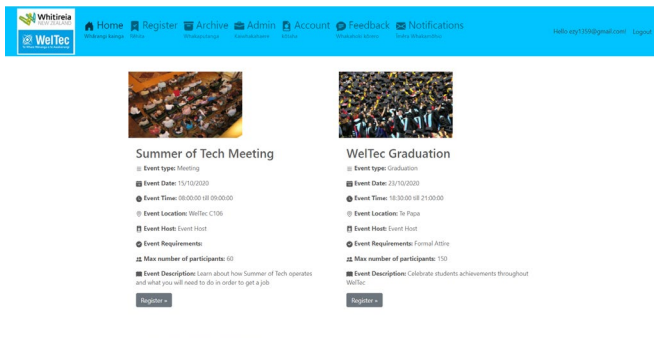


# WelTec Online Event Registration System

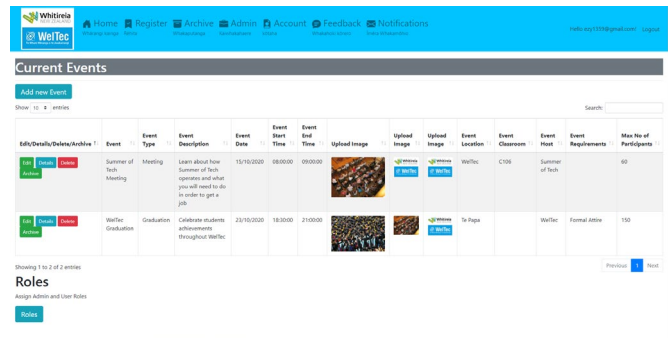
Team: Jack Partridge, Ezra Turner

Advisor: Drew Duncan

Client: Michele Carroll



Home Page



Admin Page

## INTRODUCTION

The Wellington Institute of Technology Online Event Registration System project is a web application that provides WelTec students with information related to upcoming WelTec run events, providing capabilities to view, register interest and provide feedback on events. WelTec admin have the capabilities to add, update and delete events, provide key information and images relating to how these events will be run and when.

This web application gives students a better way of knowing what events are coming up and gives admin an improved way of providing information about WelTec run events. This allows admin to gauge student interest before the event is held and aids preparation.

## DEVELOPMENT

WelTec Online Event Registration System was developed using ASP.NET core with a bootstrap 4 framework. ASP.NET core was chosen as it allows us to create the application for multiple operating systems allowing us to have the website run on a Linux environment. Bootstrap 4 was chosen as it allowed us to develop modern responsive and mobile friendly page layouts focusing on a wider variety of access.

The team chose an Agile scrum methodology approach to the development, to allow for any change by the client throughout the development by not having a set schedule. This allows us to focus on client prioritised tasks in a two-week sprint throughout development.

The team started off with an initial design approved by the client before starting website

development. Testing was done throughout with manual testing of the entire website after the proposed features had been completed with a focus on security testing. A user manual was then produced on how the admin would use the system. This project is ongoing allowing for future iterations. We produced documents that provided 'future features' and an in depth look at how the current features have been implemented to better prepare future iterations.

The team put a lot of effort into this project and the outcome reflects this, however we heavily underestimated the time taken on certain tasks. To resolve this, we removed some low priority features. The middle stage of the project was the biggest challenge and we overcome the many obstacles faced to deliver a product the client was satisfied with.

## CONCLUSION

The outcome of this project has been successful in providing a working system that sets the groundwork for further iteration.

The client was provided with a web application, SQL database, VM and the many documents that allow for future development and guide on how to use the current system.

The client was overall satisfied with the product handed over, having met a refined list of deliverables which included the main features set out by the client in the beginning. There is scope for further iterations with this project.

# 'yourlife' Life Insurance and Facebook

By: Olga Korotkova

Advisor: Dr Fahimi Ali

Host Organization: YourLife Ltd



Olga Korotkova



YourLife Ltd



## PROJECT SCOPE

The project investigated the issue of deficient user engagement on the official Facebook page of YourLife Ltd – where it has a low number of likes, comments, and shares per post. The research was undertaken due to host wanted to identify and better understand the benefits of Facebook marketing.

The objective of this project is to compare Facebook marketing tactics of 10 life insurance agencies in Australia and New Zealand to identify, which Facebook posts will increase user engagement - the number of likes, comments, and shares. The objective was guided by the following research question:

*"What are the common Facebook marketing tactics of Australian and New Zealand life insurance agencies that increase user engagement on Facebook?"*

To have an in-depth perspective and relevant knowledge of the project, a comprehensive review of academic literature was conducted. The topic areas, relevant to the research, includes technology and social media marketing in today's digital age, Facebook and its principles of operation, Facebook marketing in the financial services sector.

## PROJECT FINDINGS & RECOMMENDATIONS

To answer the research question, the primary quantitative method was used. Data was collected through quantitative analysis, using the "pen and paper" method. 10 Facebook pages of public and private life insurance agencies in Australia (5) and New Zealand (5) were observed from June 1<sup>st</sup> to July 1<sup>st</sup>, 2020. Data was analyzed using bar charts, pie charts and tables.

The major findings are the following:

1. the most common Facebook posts are all-links, text, photos.
2. the most user-engaging Facebook posts are: photos, text, company-created links.
3. the least user-engaging Facebook posts are: videos and 3<sup>rd</sup>-party-created links.

The findings are unexpected, where there is partial divergence from the cited peer-reviewed literature that links and text do increase user engagement on Facebook, while videos and third party-created links do not.

Based on the evidence, provided in the findings, it was recommended that in the long-term, YourLife Ltd may implement the following Facebook marketing tactics to improve its user engagement:

1. Increase posting frequency.
2. Adopt the best Facebook marketing practices from the Australian colleagues.
3. Focus on creating its own informative content and publish it regularly in the form of photo, text and company-created links.
4. Avoid publishing entertainment videos and sharing third party-created content.

## CONCLUSION

In conclusion, this project offered 4 long-term recommendations, based on the evidence found through primary quantitative data collection. These recommendations have equipped YourLife Ltd. with the information, necessary to solve its marketing issue and plan for a better marketing strategy in the future.