Practical Work Report

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Aiden Burgess
abur970 - 600280511

Summary

I worked at Gentrack in a team of 3 interns over the period of 2019 Dec - 2020 Feb of 12 weeks. Gentrack is a large airports and utilities company based in New Zealand, with satellite offices in the United Kingdom and Poland. The office in the Auckland CBD is large and spacious, with around 150 employees. There are many amenities such as courts, kitchens and meeting rooms.

My internship consisted of working on two extra pages for the Veovo application, which is the largest product in the airports division. These were Tax Code Maintenance and Financial Code Maintenance. Our internship team was situated in the same area as the main team, to allow easy interaction. We also had a mentor Fernando, who helped onboard the interns and helped with any issues or problems that arose.

The team was working in an Agile environment, so there were daily standups, sprint reviews and retrospectives. Our development process was managed by the Atlassian suite, which handled the creation and tracking of tickets, as well as the git repository and branches.

As my first internship, I learned a lot from this experience. Communication with team members and colleagues was an important experience. This included gaining the confidence to talk at the daily standups and to communicate delays and issues that I discovered. Technically, I learned about an enterprise development process and new technologies. The new technologies I learned were Angular, Typescript, and Cucumber. I also learned about a myriad of testing terminology and processes such as manual, unit and integration test suites.

Acknowledgement

I would like to thank Grieg, my temporary manager for helping even though he only started a few weeks earlier than I. He was understanding of our problems and considered all opinions.

I would like to thank my mentor Fernando, for always being diligent in helping us interns learn. He answered our questions quickly no matter how ridiculous.

Sannan and Annie were part of my intern team and were great friends for the internship. I enjoyed working with them and had lots of laughs.

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1 Introduction

Gentrack Ltd is a large utilities and airports software company which has locations around the world. There business is split into the utilities and aiports sides.

I personally worked for the airports side under the brand Veovo. In a team of three, we specified requirements, developed, tested, debugged the main web product using angular and typescript over the course of 12 weeks. I was guided by my teammates and mentors, who taught me the workflow, pair programmed with me, and helped me feel be a part of the team.

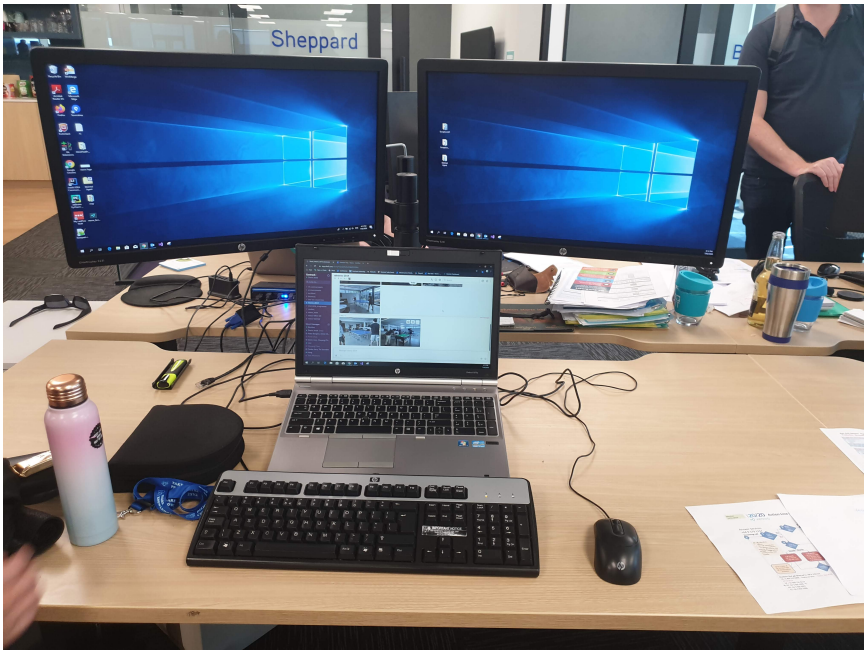

Figure 1: Desk Setup at Office

2 Company Profile

2.1 Layout of Office

The Gentrack office is located at 17 Hargreaves Street, St Marys Bay, Auckland. It is located near Victoria park and very close to the Auckland Police Station. The New World nearby was a common place to buy lunch. The general office layout is very open, with enclosed rooms reserved for meeting rooms and the CEO's office. There are two types of meeting rooms; small cubicles which could fit 1-2 people and used to relax, and larger general purpose meeting rooms often used for standups and presentations.

Another fixture of the office is the use of plants around the office. This improves the atmosphere within the office and relaxes the employees. There are many glass windows which allows light and fresh air inside on hot days. The office building has two levels, the bottom floor occupied by the utilities teams, and the top floor occupied by the airports and accounting teams. I worked on the second floor within the airports development team. Us interns had a row to ourselves and I sat in the middle seat with Annie on my left hand side and Sannan on my right hand side.

Both the upper and lower levels have kitchens, although the upper level's kitchen is used mainly just for coffee and is smaller than the ground floor. The ground floor kitchen contains microwaves, sinks, coffee machines, a fridge for employee lunches, and a fridge for drinks. It is the area that most employees go to for lunch.

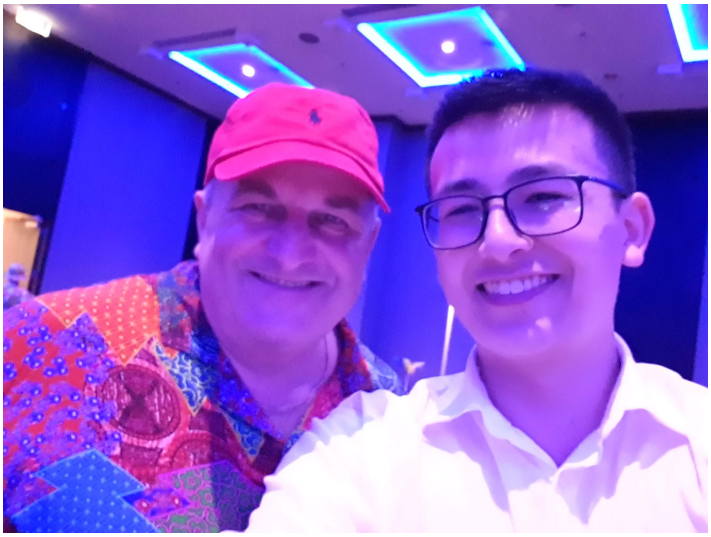

Figure 2: Selfie with CEO at Christmas Party

2.2 Staff Organisation and Structure

Gentrack is a mid-sized company with around 500 employees. There are two main areas of the business, those being utilities and airports. At the time of the internship, the utilities business was the larger venture, although experiencing some trouble with Brexit, as the United Kingdom is their largest customer. There is a team in the United Kingdom for utilities and a Poland team for airports. The utilties business is split into smaller teams such as Velocity. There are two smaller teams in the airports business, of which I was employed in the main product: Veovo.

Due to the relatively small size of the company and teams, the hierarchy structure is quite flat. I even had the opportunity of speaking with the CEO on multiple occasions.

2.3 Technical Facilities and Amenities

On the upper floor, where I was working there were several amenities. A printer room contained printers, paper, shredders, and free stationery to use at work. A small kitchen mainly used for making coffees and tea in the morning was near the printer room. It also had fruits occasionally to choose from.

The lower floor had a larger kitchen which was used at all times through the day. There was a coffee machine, fridge, and microwaves to prepare lunch. This was the most common place that people had lunch or breakfast at work. There were couches and tables to sit and eat at, but also a pool table and table tennis table to play games. Many functions were also held here throughout my tenure. There was a regular end of month drinks and pizza for the whole office.

Outside, connected to the kitchen was a large area containing a court that could be used for tennis, basketball and football. There is also an area to play darts.

3 Description of works

The overall aim of the internship was to create two new pages on the Veovo application for tax code maintenance and financial code maintenance. This would be useful to airlines as they could easily update and see the history of tax codes and financial codes. I worked with a team of 3 interns, in a larger team of 10 people who managed the development of Veovo.

3.1 Requirements

After receiving some design documents, we as a team had to break them into features. These features could also be further broken down, in order to understand the scope and complexity of each task. From the tasks, estimates can be generated and then used to calculate a deadline. Each design should also have a user requirements list that is part of the test suite.

3.2 Agile Process

Each morning at 8:45 AM there was a standup meeting, where each member of the team discussed what they had done the day before, and what the plan was for the rest of the day. A team member from Poland would often be present as well to share what was being worked on for their team. It was also an opportunity to announce what blocking issues there were, which would be resolved by other team members helping to unblock that task.

One major tool we used to track progress and code was the Atlassian Suite. Specifically, we used Jira, Bitbucket, and Confluence. Jira was used to track tasks and link them to code changes. Bitbucket was used to hold our source code and perform any source code changes. Confluence was used for documentation for the organisation, holding things like meeting minutes, technical documentation, and other helpful information.

3.3 Angular Web development

The frontend of the web application for Veovo is written using Typescript under the Angular framework. Angular is the largest web development framework used for enterprise products, followed by React and Vue. The existing code base is large and quite complicated so it took a while to get accustomed to the style and implementation decisions. In order to develop the project, I used the editor VSCode to make code changes. To see the results of my code changes, I served the website locally to test and verify the behaviour.

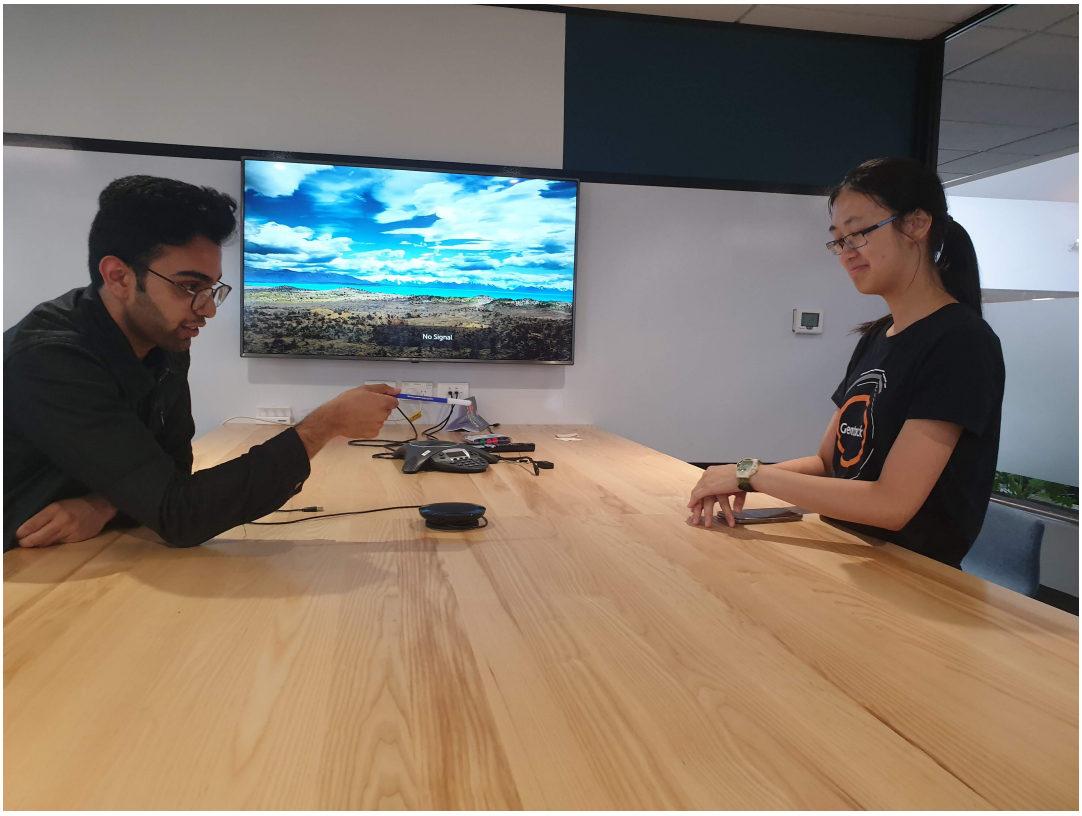

Figure 3: Standup Meeting Room

3.4 Manual Test cases

As the projects were front end, some manual testing had to be completed to verify correctness and functionality. This was an extremely thorough in process, with all aspects of the application needing to be verified. For example, testing night mode, verifying data in the database, making sure text is correct, in right format, in the right place. Two sets of manual tests had to be written for the projects. They were quite simple to write as there were already examples to work off of.

3.5 Automation Testing

Manual test cases can take a lot of time to run, and are therefore expensive as a team member must meticulously look over each step. They are also unreliable, as humans can have lapses in concentration and may skip steps which they think might not be impacted.

Therefore, to reduce the amount of manual test cases, automated testing is implemented for common use cases of Veovo. These also had to be created for the new Tax Code Maintenance and Financial Code Maintenance pages. The test code was written in Gherkin using the Cucumber framework. It utilitises the page object model (POM) which is a design pattern which models common UI elements and their interactions.

When running the tests, it would automatically click buttons, fill inputs, and verify that the data submitted to the server matches what is expected. This process is very entertaining to watch but can be ran in the background for efficiency.

4 Reflective appraisal

4.1 Impressions and performance

Gentrack is a vibrant yet mature software development company that operates in many different fields and countries. The technology being used is constantly updating, although there are still some legacy systems and languages being used such as GenBasic. There is a strong emphasis on testing and robustness of software in the airports section, as shown by the unit, manual and automated test suites as well as committed test engineers on our team.

Employees are treated with respect and nice amenities such as free beers and pizza are provided each month. There is also care taken for clean and effective meeting rooms and events. The lunch break is a time to interact with other members of the company, even if not in the same team.

There was a missed deadline for Tax Code Maintenance by one week, however, by the end of the internship, both projects were completed. This indicates that my performance was good.

4.2 Lessons Learned

From gaining confidence, I learned to ask for help from my mentors, and even reach out to other team members when blocked on an issue. There was a situation where our team discovered that we were not going to be able to deliver the Tax Code Maintenance page within the specified deadline. At this point we had to itemise and create estimates of how long the rest of the changes needed were. We discussed these findings with our manager and decided together to postpone the release of this feature to the next sprint.

I learned how to work in a team and work together in a team, to perform tasks faster and with a better understanding. This comes from listening to and appreciating the different perspectives and opinions in a team. One of the biggest aspects of being able to code more effectively is debugging. My mentor Fernando showed how to systematically uncover the area of code in which a bug was present. At each level of the application, the data should be checked against the expected value. If this differs, then the logic at this level of the application is faulty.

I gained communication skills, both with my peers and other team members. If there is a concern about a project or task, it should be brought up to be discussed and solved. The daily standups at the start were very nerve-wracking, but I gained the confidence to speak with my team.

Technically, I learned about many new technologies and processes. The Agile framework utilised by our team meant I was included in the daily standups, sprint reviews, and retrospectives. I learned Angular, Typescript for the frontend code and Cucumber for behavioural driven development testing. The testing of the application included manual test cases, unit tests, and integration tests, which were new concepts to me. The Atlassian suite taught me the development process in a larger team. This required proper branching, breaking down tasks, and estimates for tasks.

5 Conclusions

My summer working at Gentrack was a very interesting experience, and my first time working at a software company.

Compared to university or personal projects, working at Gentrack gave me experience working with other software engineers, which is a very different process. To be effective in a team, a software engineer needs to have the skills to communicate well with other engineers. This can help with deadlines, estimates, and collaboration.

I learnt technical skills from my internship, such as Typescript, Angular and Cucumber for testing. There were many practical parts of testing that I discovered, such as manual, unit, and integration testing. Agile was also interesting to learn about in an actual team environment.