

Advanced Technology Attachment Programme (ATAP)

Interim Project Report

at

Envision Digital Pte Ltd

Reporting Period:

Jan 2023 to Jun 2023

by

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Department of Computer Science

School of Computing

National University of Singapore

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Project Title: Backend Engineer Intern

Project ID: AY221172387

Academic Supervisor: Prof Huang Zhiyong

SUMMARY

I took on the role of a Backend Engineer intern at Envision Digital, under the Buildings department. My job scope involves architecting solutions to problems identified, designing and maintaining efficient and reliable Java code to ensure the best performance and responsiveness of the applications.

Up till the month of April, I was mainly working on developing batch jobs to clean up old data from the databases to optimise query performance, as well as to implement a role authorization system for our API calls, with occasional bug fixing tasks.

Subject Descriptors:

Software Engineering

Software Development Life Cycle

Keywords:

Software Engineering

ACKNOWLEDGEMENTS

First and foremost, I would like to use this opportunity to thank my supervisor, Kaiping, for the chance to intern at this company and also for also checking in on me on regular occasions. I would also like to extend my gratitude to my fellow team members, who were especially hospitable and approachable, and always willing to clarify my doubts and render their assistance whenever I encountered difficulties.

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INTRODUCTION

Background and Organisational Structure of Host Organisation

Background

Envision Digital provides software services such as artificial intelligence software to help governments and companies reach their net zero goals. Envision Digital was founded in 2017 and established its first office in Singapore in 2018, which also serves as its global headquarters. Through EnOS™, its proprietary Artificial Intelligence and Internet of Things (AIoT) operating system, Envision Digital has helped governments and companies across the world accelerate progress toward a net zero future and improve their citizens' quality of life.

Today, it has grown to become the world's leading AIoT software leader for net zero mission, employing close to 1000 employees from 29 nationalities across 13 offices globally. As the world's largest digital AIoT platform for decarbonization, EnOS™ now manages and connects more than 400GW of energy assets and 200 million smart devices across its EnOS™ Renewables, EnOS™ City and EnOS™ Ark solutions, enabling energy, machine and system efficiency for its customers.

Organisational Structure

Staff Backend Engineer → Me

Principal Activities of Host Organisation

Envision Digital provides software services such as artificial intelligence software to help governments and companies reach their net zero goals.

Training Programme within Host Organisation

- Senior team members would assign me tickets to work on, which could be implementing a new feature, researching on a topic or fixing bugs.
- I would work on these tickets, seeking help from my colleagues/supervisors along the way whenever I was stuck, and then update them on the progress.
- There was also the option to choose interested tickets to work on from the backlog, if there was spare capacity during the sprint.

Position of Host Unit within Host Organisation

- Buildings Team

TRAINING SCHEDULE AND ASSIGNMENTS

Training Schedule by Month for the Entire Training Period

Training Assignments Completed in 1st Month

- Onboarding and product familiarisation exercises
- Bug fixes

Training Assignments Completed in 2nd Month

- Developed a Azkaban batch job to automate deletion of files from the platform
- Investigated Jenkins scripts to fix pipelines due to an upgrade of Maven plugin upgrade.

Training Assignments Completed in 3rd Month

- Developed a Azkaban batch job to regularly delete old data from the database to improve query performance and reduce server costs.
- Implemented a role authorization system to authorize users for several selected protected endpoints
- Researched and implemented a compression scheme for headers for API calls, to allow the role authorization system to take effect.

KNOWLEDGE AND EXPERIENCE GAINED

Technical Knowledge Gained From Assignments

- I learnt to write clean, reusable and scalable code.
- I learnt how to craft and write unit, integration and regression tests, including the use of mocks to ensure that components worked well together.
- I got to learn about advanced bash scripting.
- I also got to deepen my knowledge of the Spring Boot framework.
- I also got to work with new tools and technologies such as Jenkins, Azkaban, Redis, Docker and Kubernetes.

Organisational/Industry Experience Gained From Assignments

- I also got to witness the Software Development Life Cycle at play, and the build-up towards project releases.
- I also got a chance to participate in Scrum methodology and attend daily stand-ups.
- I also got the chance to interact with different stakeholders, such as product owners, as well as quality assurance teams, to deliver features.
- Software engineering goes beyond just coding, the stage of gathering and understanding requirements and specifications for new features to be developed is also equally important.

Areas of Applicability of Knowledge and Experienced Gained

- I learnt to navigate through a large code base with large complexities.
- I learnt to realise new features through a product requirement document.
- I learnt how to design test cases to cover edge cases for automated testing.
- I also learnt to debug effectively through the use of logs to figure out the root issues.
- I also learnt to communicate confidently with my peers and stakeholders, learning to clarify the requirements of the tasks and speaking up in meetings.

CONCLUSION

Summary of Work

- Development of batch jobs and APIs to clean up data from databases and platform side
- Implementation of role authorization system for API calls
- Bug fixes

Problems Faced

- Data processing logic could sometimes be rather complex, and took time to understand
- Some of the features developed faced bugs and were only discovered during the phase of QA testing, which indicates that my designed test cases were not comprehensive and robust enough.
- Had some issues with Spring Boot framework at times

Assessment of Training Experience

- Internal documentation is updated frequently and open sharing culture across teams helped to reduce information silos, which was crucial in helping me understand the latest technical design and status of the product.
- I was given ample opportunities to be involved in important discussions and my suggestions were also well taken into account, which made me feel valued as a team member.
- There was also a short sharing session every Friday, which is a nice opportunity to catch up with the latest technology trends.
- The tasks given were diverse in scope, which allowed me to work on different parts of the product, which helped to enhance my learning experience.