Project Tātarāmoa for Seequent Ltd

Brendan Mc Dermott
Student
Ara Institute of Canterbury
Brendanmcdermott.dev42@gmail.com

Kelsey Vavasour
Industry Supervisor
Seequent Ltd
Kelsey.vavasour@seequent.com

Dr Luofeng Xu
Academic Supervisor
Ara Institute of Canterbury
Loufeng.xu@ara.ac.nz

ABSTRACT

With the acquisition of both Seequent and Sensemetrics into the Bentley Industries family, Sensemetrics existing IoT sensor data is a resource that so far has gone untapped by Seequent applications such as GeoStudio or Leapfrog. With competitive markets in software development, this resource could add to Seequent applications own business value and provide further insights for their clientele. This paper describes the Work Integrated Learning Project at Ara Institute of Canterbury completed in partnership with Seequent Ltd. The project sought to use the existing Sensemetrics data in Seequent applications via a façade/proxy API. The application could act as a go between for Sensemetric data while allowing Seequent to ensure its own formatting, bucketing and aggregation.

Keywords: Software development, API, business value, Sensemetrics, IoT, Data

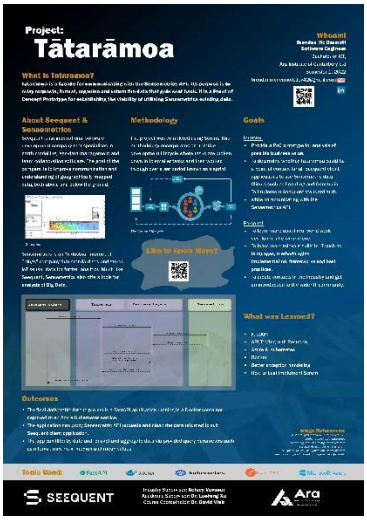
1. INTRODUCTION

Seequent Ltd is an International Geo-data software development company. It was created in New Zealand and has grown rapidly over the years.

Product owners within Seequent identified the possible value that Sensemetrics data could have for its clients. This missed opportunity warranted some investigation and so a project was established with the aim of creating a proxy API for Sensemetrics that Seequent clients such as GeoStudio and Leapfrog could use.

This project was undertaken by Brendan Mc Dermott who is a BICT student of Ara, with a set 300 hours to complete it. The proposed project was a Proof of Concept (PoC) prototype which could be used to investigate the value of further development.

Figure 1



The Tātarāmoa Poster was displayed at the Emerge Event to illustrate the work the student had completed for the BCIS309 work integrated project course.

2. PROJECT DETAILS/PROCESS

The project was given the name Tātarāmoa which is a native New Zealand plant. This not only was symbolic of Seequents roots and culture but also served as a development name that would later be changed for production.

The API itself is a façade/proxy to Sensemetrics own API. It responds to numerous HTTPS request and relays them either through HTTPS or JsonRPC. Once data is returned it can be formatted to Seequents liking, including filtering by date and options for the bucketing and aggregation of data. This functionality was separated into a business-layers to allow for easier modifications or additions in the future.

The project was completed over a 12-week period using 2-week sprints to iteratively develop the product. The first sprint concentrated on the Discovery phase and entailed initial requirements gathering, setting up environments and designing the initial concepts for the API. The following 10 weeks were development sprints. For each sprint small portions of the product were built piece by piece. This allowed for constant collaborative decision making and incremental peer reviews via GitHub pull request.

3. TECHNOLOGY

To facilitate the processes and development the following tools were used:

- Pycharm, FastAPI and Pytest.
- Postman.
- Jira, Confluence and Slack.
- Miro.
- Git and GitHub.
- Docker.
- Azure and Kubernetes.

4. RISK MANAGEMENT

Risk Management was conducted using the Microsoft risk management framework. Numerous risks were identified early on and a couple during development. Each risks potential impact was quantified by estimating impact and likelihood. Once identified risks were prioritised and mitigation and contingencies were developed to reduce their

potential negative impact on the project. Some of these risks became reality during development but thanks to plans in place, each risk that materialised had a reduced impact on the overall project. Examples of mitigations were extra time allotted for sickness and backing up work to USB and cloud storage to prevent data loss/corruption.

5. QUALITY ASSURANCE

Quality assurance for the project was carried out in two main ways. Quality assurance and control tables were used to keep track of deliverables and processes, and white and black box testing was conducted to ensure the functionality of each deliverable.

The original table was based loosely on the Virginia Tech model (Virginia Tech, nd) but was customised to suit the needs of the current workflow and Seequents own processes. The tables listed processes that needed to be followed and the deliverables standards that needed to be achieved. Each of these were recorded along with evidence of the process or supporting evidence of the quality of the deliverable. Examples of this were peer reviews by team members and sign off sheets from academic staff.

Each deliverable was also tested using Postman to conduct black box testing. When further functionality was added to the project Pytest was used to create white box tests that tested functionality within the app. Each endpoint was tested, and each component of the functionality was tested.

6. REFLECTION

Tātarāmoa is a thin slice of what a final product will look like. Its purpose was to provide insights into whether a fully developed proxy API would be desirable, feasible and viable. While by the end of the project some of the requirements were still not fulfilled, the overall product does serve its purpose and met the expectations of stakeholders. Development suffered a few issues around accesses and pacing, though none of these issues ever hindered it significantly. The experience was also a great learning experience and has helped the student develop further as a Software Developer.

The risk and quality assurance management plans that were created for the project were invaluable for planning, documenting, and protecting development against potentially harmful risks. Along with burndown charts, ticket sizing helped ensure many of the iteration deliverables were easy to plan for and estimate. Scrum allowed for the flexibility to change the desired requirements as needed and ensured that the project was conducted with maximum stakeholder engagement.

The final deliverable was a FastAPI application running in a Docker container launched onto an Azure Kubernetes cluster. The API relayed HTTPS requests to Sensemetrics either over HTTPS or JsonRPC to return data and alter it if necessary. The sensor data endpoint for the API allowed for the data to be filtered by dates provided and allowed for bucketing and aggregation of the data before it was returned. This approach means that any Seequent product can have access to this functionality without each one having to code it themselves.

7. REFERENCES

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