Project Handover Document

City of Melbourne Open Data Playground

Trimester 2, 2022

Table of Contents

1. Project Information

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1.3.Project Team

City of Melbourne Open Data Playground

Student #	Name	Snr/Jnr	Undergrad/Postgrad	Role
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2. Project Overview

In trimester 2 2021 the project's scope was redefined by the client. This introduced the current problem statement:

The City of Melbourne has been an Australian leader in Open Data since 2014. The latest research and local user engagement have identified a gap where users would like access to Open Data example tools so that our users can re-use these tools in their apps and city solutions.

In trimester 3 2021, the client identified two key benefits that this re-definition of the scope would deliver for this project:

- The toolkit examples created will be developed to maximise efficiency and time saving for the council's staff. This will save council time through the reduction of calls and emails relating to questions of how to use council's Open Data platform API.
- The use cases lists are the most common customer requests for assistance in creating a data solution using City of Melbourne's open data/API.

In Trimester 2 2022 this project continues to deliver a proof-of-concept example of how calls to Open Data API can be made to deliver a solution. Figure 2.1 illustrates the major components of the Melbourne Open Data Playground platform.

Building on the foundation of work completed in the previous trimesters, our project focussed on delivering five key outputs:

1. Developing a staging pipeline to assist with development
2. Implementing the use cases developed in trimester 1 2022
3. Creating new use cases
4. Testing and updating all functionality and usability of the site
5. Redesigning the Melbourne Open Playground and developing new branding

Figure 2.1: Melbourne Open Data Platform High Level Architecture
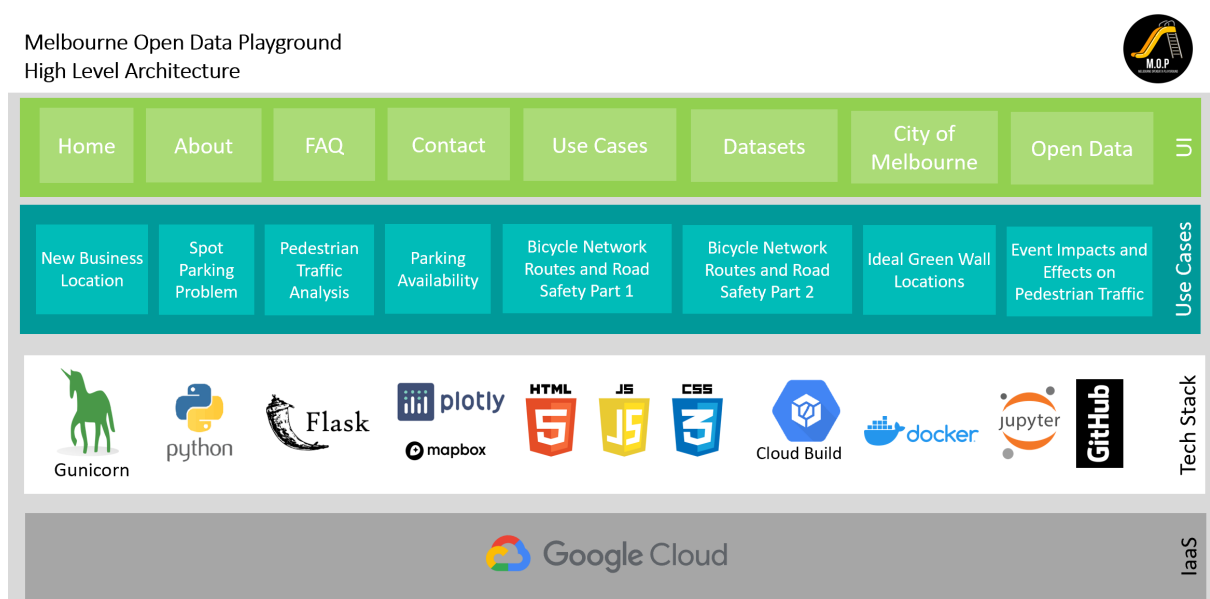
This trimester saw the data science and engineering team create multiple new use cases within three work streams: Safety and Wellbeing, Environment and Sustainability and Business and Activity. These use cases explored and analysed a variety of datasets available from Melbourne Open Data. Utilising python libraries such as Selenium, folium, Plotly, and mapbox, our data science team was able to deliver highly stylized, interactive tools to help in developing business insights using the City of Melbourne's Open Data API.

The web development team focussed on developing a staging pipeline as well as implementing the use cases developed in trimester 1. Improvements were made in conjunction with the Design team, fixing links and updating functionality and usability. The team also worked on documentation which will assist the new trimesters students in setting up their development environments.

The design team was centred around a redesign of the Melbourne Open Playground web app. This included creating a look to the website, new logos and colour schemes. As well as this the team performed functionality and usability tests on the site. These deliverables included comprehensive testing of the site and all of its links. Then working with the web development team to implement these changes.

The work completed this trimester leaves the project and the students coming onto the project next trimester in a great place to continue with the project. This will allow next trimesters team to fast track the implementation of new use cases, implement site updates and further the project.

3. Public GitHub Repository

In addition to the Melbourne Open Data playground, the project has also curated a public-facing GitHub. In this environment we showcase python code that supports and extends the use cases integrated onto the web portal.

The Jupyter notebooks are shared for the benefit of those who may be more technically motivated to explore and build upon our examples.

Readme pages help users to navigate to and explore these works. This was created to aid in building a community around the playground and Melbourne Open Data more generally. Figure 4.1 below illustrates the home page of the GitHub site.

Figure 3.1: Public-facing GitHub repository
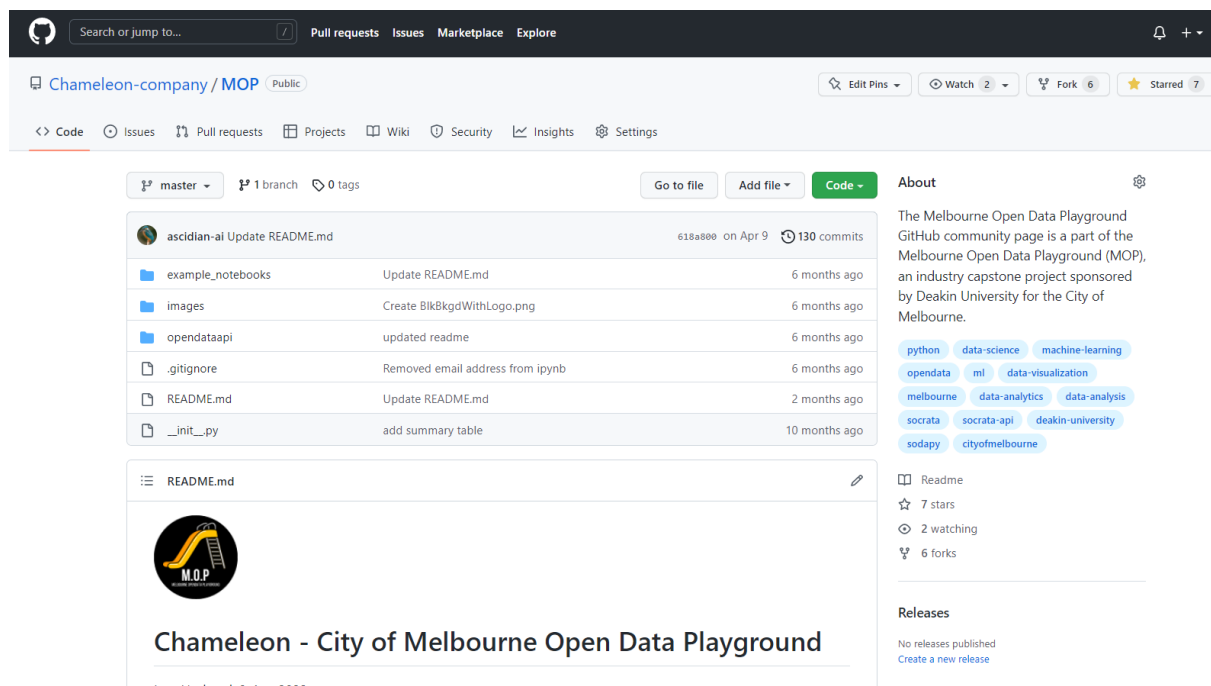
4. Completed Deliverables

In this section we describe the key deliverables as well as the main teams and contributors responsible.

4.1. Domain 1: Safety and Wellbeing – Use Case 1 Pedestrian Footpaths and Road Safety (Bree and Jack)

Extending on the work completed from exploring bicycle routes, cyclists and road safety this use case utilises Melbourne pedestrian route network data and combines VicRoads traffic accident data to explore accidents involving pedestrians within Melbourne CBD. Two python notebooks have been produced to explore the use case. Future work on this use case and related python notebooks can include peer review, application of company branding and colour palettes and publishing to the project website.

Trello:
Part 1 Analysis
https://trello.com/c/l5dknddG/100-domain-1-safety-wellbeing-use-case-1-pedestrian-road-safety-task-14-pedestrian-route-network-and-accidents-notebook-1
Part 2 Analysis
https://trello.com/c/mcSZNRDi/110-domain-1-safety-wellbeing-use-case-1-pedestrian-road-safety-task-15-part-2-of-pedestrian-safety

GitHub:
Part 1 Analysis Notebook:
https://github.com/Chameleon-company/MOP-Code/blob/Bree-M-Branch/datascience/usecases/usecase-pedestriansafety-part1.ipynb
Part 2 Analysis Notebook:
https://github.com/Chameleon-company/MOP-Code/blob/Jack-Analysis/datascience/usecases/usecase_pedestriansafety_part2.ipynb

4.2. Domain 1: Safety and Wellbeing – Use Case 2 Impacts of High-Rise Residency (Andrew and Jack)

This use case explores the impacts of high-density housing and accessible and affordable public transport. Work completed in Trimester 2 2022 included researching and defining helpful statistical metrics to measure the likelihood of residents of high-density housing utilising public transport as well as inspecting geographical aspects of public transport systems and high-rise dwellings. Future work on this use case can include the analysis of income and liveability score data, finalisation of the python notebook, peer review, application of company branding, colour palettes and publishing to project website.

Trello:	https://trello.com/c/YMRSISg7/102-domain-1-safety-wellbeing-use-case-2-impacts-of-high-density-housing-public-transport-task-13-performing-eda
GitHub:	https://github.com/Chameleon-company/MOP-Code/blob/Jack-Analysis/datascience/usecases/usecase-highriseimpact-part%201.ipynb

4.3. Domain 1: Safety and Wellbeing – Bicycle Route and Road Safety Notebook Part 2 (Bree)

This use case extends on previous work completed in Trimester 1 2022 on 'Bicycle Route Network and Accidents Part 1' and involves an exploration of the Melbourne Bicycle network through the lens of VicRoads traffic accident data, 'crash stats'. This use case focuses on the geography, timing and circumstances of accidents involving cyclists in the Melbourne CBD. This use case was completed and published to the project website in Trimester 2 2022.

Trello:	https://trello.com/c/iXe7rdeS/70-publish-to-website-bicycle-route-network-and-accidents-notebook-2
GitHub:	https://github.com/Chameleon-company/MOP-Code/blob/master/datascience/usecases/usecase-bicyclenetworkroadsafety-part2.ipynb

4.4. Domain 2: Environment & Sustainability – Use Case 1 Environmental Sensor Study (Julian)

A previous study conducted by Chameleon found that the current number of environmental sensors around the Melbourne CBD is insufficient to provide highly granular data. This use case attempts to discover how many would be ideal for the city. This use case could be expanded upon by further refining the results and providing an accuracy heatmap for the area.

Trello:	https://trello.com/c/eUQWrCTa/89-domain-2-environment-sustainability-use-case-1-environmental-sensors-for-the-melbourne-cbd
GitHub:	https://github.com/Chameleon-company/MOP-Code/blob/Julian-C-Branch/datascience/usecases/usecase-EnvironmentalSensorStudyRevA.ipynb

4.5. Domain 2: Environment & Sustainability – Use Case 2 Ideal Green Roof Locations (Hannah & Ryan)

This use case analysed a range of datasets to determine the suitability of the roofs of Melbourne for different types of Greening, installation of solar panels, or a cool roof. It used modelling data created by the CSIRO regarding building energy consumption, as well as an external data source from the Victorian government regarding the urban heat index and heat vulnerability. This use case could be expanded on in any way you see fit.

Trello: https://trello.com/c/xk8EsSWK/90-domain-2-environment-sustainability-use-case-2-the-impact-of-green-exteriors-on-energy-consumption

GitHub: https://github.com/Chameleon-company/MOP-Code/tree/master/datascience/usecases/greenroof_usecase

4.6. Domain 2: Environment & Sustainability – Use Case 3 Smart Bin & Disposal Optimisation (Bose)

This use case analysed the open data on waste collected in tonnes via strategically placed public litter bins within the city, those from illegal dumping, and street sweepings. The purpose is to determine if any increase in ordinary public litter bins will reduce tonnes of waste from street sweepings and if there will be a change in illegal dumping volume, thus considering the existence of any connection among the three sources of waste. A comparison was further made to determine the relevance of smart bins with respect to how tonnes of waste change with the introduction of smart bins. By comparing tonnes of waste before smart bin usage and after the usage of smart bins, this analysis provides clarification and validate relevance of smart bins towards achieving a smarter city of Melbourne through waste management activities which also makes the streets cleaner and more liveable. This use case could be updated with a newer dataset if one is released to provide more perspective on the importance of smart bins and waste management in general.

Trello: https://trello.com/c/9Lc2bM5k/109-use-case-domain-3-smart-bin

GitHub: /MOP-Code/Smart_Bin_&_disposal_optimization_(2).ipynb at Abosede-A · Chameleon-company/MOP-Code (github.com)

4.7. Domain 2: Environment & Sustainability – Green Walls (Julian)

This use case tries to determine the ideal locations for the installation of Green Walls around the Melbourne CBD. There were to be considered a variety of factors involved in situating the Green Walls within the city. One factor involved places with high levels of particulate matter that would be good places for green walls. Another factor involved different kinds of insect species that were situated at various survey places around the city, in conjunction with the tree canopy data, which would solidify some kind of proof as to why extra vegetation is good for insect populations. This use case is a work in progress and could be expanded on in several ways.

Trello: https://trello.com/c/msfOWeak/71-publish-to-website-ideal-green-wall-location-identification-ipynb

GitHub: https://github.com/Chameleon-company/MOP-Code/blob/master/datascience/usecases/usecase-GreenWallLocationIDRevA.ipynb

4.8. Domain 3: Business & Activity – Use Case 1 Deep Analysis on factors Affecting Pedestrian Numbers (Barkha and Brendan)

Work has been done on ingesting and integrating external datasets which look to be good candidates for influencing pedestrian numbers, and some preliminary analysis has been done. Further work is required with integrating EDA which is spread across several notebooks to ensure consistent narrative.

Trello: https://trello.com/c/Ee1wYLFz

GitHub: https://github.com/Chameleon-company/MOP-Code/blob/Brendan-R-Branch/datascience/dataanalysis/Other%20EDA/event_impact_new_draft.ipynb

https://github.com/Chameleon-company/MOP-Code/blob/barkhaj-branch/datascience/dataanalysis/Other%20EDA/eda_compare_pedestrian_traffic_precovid_to_now.ipynb

4.9. Domain 3: Business & Activity – Use Case 2 Analyse and model high-rise residency against demand for public transport (Andrew and Brendan)

Work on this use case has not progressed. The incorporation of high-rise data, and analysis of the impacts, has been started under Domain 1.

Work on this use case will wait pending development of the Domain 1 analysis.

Trello: https://trello.com/c/ZMzb07yS

GitHub: N/A.

4.10. Domain 3: Business & Activity – Use Case 3 Merge new business analysis and pedestrian traffic analysis – Day and Night (Weiren and Barkha)

This use case aims to perform clustering to identify similarities among pedestrian traffic sensor locations for new business. Similar clusters may have similar solutions that can be applied to increase activity. Variations were found in day and night traffic using simple modelling KMeans. Next steps for this component, we can add other factors impacting traffic, and experiment with additional types of clustering techniques, to improve cluster detection.

Trello: https://trello.com/c/F3TDkjcw

GitHub: https://github.com/Chameleon-company/MOP-Code/blob/barkhaj-branch/datascience/dataanalysis/Other%20EDA/evaluate_business_location_using_pedestrian_traffic_day_night.ipynb

4.11. Domain 3: Business & Activity – Use Case 4 Pedestrian Numbers Predictive Modelling (Brendan and Weiren)

This use case aims to perform predictive modelling on the number of pedestrians in an area, using the City of Melbourne's pedestrian sensor network.

Modelling has been done with LSTM, GRU, hybrid LSTM/GRU, TBATS, SARIMAX, and ensemble methods for time series predictions. Multiple external datasets have been added to see whether other features (such as climate) help improve the accuracy of the models.

To do: the notebook repeats a lot of code, this needs to be tidied up. Only a single sensor has been analysed, this needs to be broadened so that the analysis can be used across all of the sensors. Seasonality and seasonal adjustment need to be explored further. Different models should be tried. A way for end users to interact with the notebook and access the predictions is also required.

Trello: https://trello.com/c/egdTlXo9

GitHub: https://github.com/Chameleon-company/MOP-Code/blob/Brendan-R-Branch/datascience/dataanalysis/Other%20EDA/ensemble.ipynb

4.12. Technical Documentation – Peer Review and Quality Assurance Work Practice (Hannah)

This document provide a brief introduction to the core concepts of code review, best practices to produce useful feedback for peers, and guiding questions that can be used when giving feedback. It is a living document that can be altered or expanded based on the team's needs.

Trello: https://trello.com/c/Ghc0zKRd/81-data-science-team-documentation-peer-review-testing-and-quality-assurance-work-practice

GitHub: https://github.com/Chameleon-company/MOP-Code/blob/master/datascience/documentation/Peer%20review%20work%20practices.pdf

https://github.com/Chameleon-company/MOP-Code/blob/master/datascience/documentation/Peer%20review%20work%20practices.docx

4.13. Technical Documentation – Parameters for Publishing Python Notebooks Work Practice (Brendan)

This document provides a guide to taking a use case which has been developed as a Jupyter Notebook, and getting it published by the Web Dev team.

The first draft has been completed, with each step in the process being described. It needs to be reviewed, and the Web Dev team will need to be consulted for input.

Trello: https://trello.com/c/yTBy0SYW/82-data-science-team-documentation-parameters-for-publishing-python-notebooks-work-practice

GitHub: N/A.

4.14.   Web Development Team – Implementing Melbourne Bicycle Network Routes and Road Safety Part 2 (Michael, Marcel, Eric)

In the previous trimester, the data-science team had created use-case templated for the web development team to implement into the production web-app. The team uses a guide that was created in previous trimester for implementing them, and these use-cases were implemented and tested over a 1–2-week period. The use-cases are given to us in a exported html format which we must add all the styling that exists from the web-app.

Trello: https://trello.com/c/iXe7rdeS/70-publish-to-website-bicycle-route-network-and-accidents-notebook-2

GitHub: https://github.com/Chameleon-company/MOP-Code/pull/41

4.15.   Web Development Team – Implementing Event Impacts and Disruption on Pedestrian Traffic (Sammy, Caleb, Tianqi)

The use-case was implemented and tested over the period of a week. By using the Data Science team's Jupyter html export and converting this into a template that matches our web-app styling and adding a use-case tile to allow access from our primary webpage.

Trello: https://trello.com/c/CnsTIgi8

GitHub: https://github.com/Chameleon-company/MOP-Code/pull/40

4.16.   Web Development Team – Implementing Ideal Green Wall Locations (Sammy)

In the previous trimester, the data-science team had created use-case templated for the web development team to implement into the production web-app. Julian had created the Green Walls use-case so we stayed in touch with him to get everything that was required, the team followed the procedure for implementing the html export.

Trello: https://trello.com/c/msfOWeak/71-publish-to-website-ideal-green-wall-location-identification-ipynb

GitHub: https://github.com/Chameleon-company/MOP-Code/pull/33

4.17.   Web Development Team – GCP Staging Pipeline Plan (Shlomi, Michael Sammy)

At the beginning of the trimester, the team met to try to brainstorm on how we would create a function CI/CD pipeline for the project that would allow us to automatically run acceptance tests against the most recent staging changes that would be made to the web-app. This document outlines our thought process on how the new pipeline would work. While things may have not gone according to the plan, we used this as a base for our thinking and what we would need from a testing framework, as well as the limitations that cloud Build provided. The plan would also later become instrumental in deploying the new pipeline to the client facing product.

Trello: https://trello.com/c/Ste5zpMb/75-plan-staging-pipeline

4.18.   Web Development Team – Taiko Acceptance Tests (Shlomi)

Taiko is a headless chromium browser which we use as a browser testing automation tool. Simultaneously we also use Gauge which is a test runner which allows us to accept and throw the results in the middle of a build. The goal with the acceptance tests was to ensure that all elements which were expected as a baseline appear in the web-app. Elements such as but not limited to: Navigation Bar, Links working correctly and clickable elements. The goal was to have these Acceptance tests run against a staging environment in the upcoming CI/CD Pipeline Deliverable

Trello: https://trello.com/c/gbHNAx82/92-taiko-development-testing

GitHub: https://github.com/Chameleon-company/MOP-Acceptance-Tests

4.19.   Web Development Team – Adding Unit Tests to CI/CD Pipeline

Towards the end of Sprint 2, the team needed to find the best way to add the acceptance test into the Cloud Build schematic (Cloudbuild.yaml). In this deliverable we added 2 addition steps into the Cloudbuild.yaml file where we would first create a staging environment where the tests would be run against, and secondly, we added a cloud builder for the tests to be run. The tests have their own docker image, which is build and run. The tests currently are pointing towards the staging environment where the tests run and check the suitability of the web-app. We first check to see that all element links point to the right place and that crucial parts of the web-app work such as the search functionality, as well

as ensuring that the navbar appears in every element. This was the largest deliverable completed by the team and is now live in the client facing environment.

Trello: https://trello.com/c/4F4zs3fV/78-add-unit-tests-taiko-testing-to-staging-pipeline

GitHub: https://github.com/Chameleon-company/MOP-Code/pull/50

4.20. Web Development Team – Creating Development Environment Installation Video

Although our team already had written documentation, we found that it was important to provide a visual alternative that shows all the steps and context menus required to get the web development environment setup.

Trello: https://trello.com/c/p4u14afU/77-development-environment-tutorial-video

Video: https://youtu.be/QMnUqf_jioo

4.21. Leadership Checklist

The leadership checklist is a week by week break down of the tasks and responsibilities of the City of Melbourne Project Leader. This should be a guide only and not taken as Gospel, and hopefully it will guide future Project leaders in running the project smoothly.

GitHub: https://github.com/Chameleon-company/Chameleon-Handover-Documents/tree/main/2022-T2/cityofmelbourne

4.22. Design Team Wireframing

Trello: https://trello.com/c/l20CDQha/94-wireframes-creation

GitHub:https://github.com/Chameleon-company/Chameleon-Handover-Documents/blob/main/2022-T2/cityofmelbourne/designteam/Figma_Wireframe_Transfer_Document.pdf

4.23. Design Team Research

The Design Team researched Website Visuality, Cybersecurity, Colour Palette, Logo Design, and Functionality Framework for Sprint 1.

GitHub: https://github.com/Chameleon-company/Chameleon-Handover-Documents/blob/29a356abd8f978053d8f73e67d1dd7aaac9df8ec/2022-T2/cityofmelbourne/designteam/SIT374%20Design%20Team%20Sprint%201%20Research.pdf

4.24.   Technical Documentation – Simple Ways to Writing Use cases, User Stories, Selecting variable (Bose)

This document provides a guide to bridging the knowledge gap about use cases, user stories, selection of variables, and ease steps to explore data to yield a positive benefit based on the goal of the city of Melbourne. It expresses writing a use case, understanding how to write a use case, what user stories should contain, the difference between user stories and use cases, how data should be visualized, and that research and a thorough look at datasets is required. Identifying and determining variables- (response and explanatory) which sets out a better understanding of relationships between the variables and what insight it offers.

This can be used after or before reading the induction guide within the first one or two weeks of the Trimester as part of the onboarding document to provide fundamental knowledge of tasks ahead.

Trello: https://trello.com/c/2vABIGrP/111-guidance-on-how-to-generate-use-cases-user-stories-from-available-datasets

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T2 2022

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5. Roadmap

5.1. Progress in 2022

The Melbourne Open Data Playground is the result of three years of development and industry collaboration with the City of Melbourne to support greater community and industry use of its published open data sets. The current implementation of the Melbourne Open Data Playground web application (site) and its associated GitHub repository came to fruition in Trimester 2 of 2021 and has experienced significant enhancements this trimester (T2 2022). T2 2022 saw multiple new use cases created in addition to a re-branding of the web app and logo and the implementation of a development staging pipeline.

5.2. Future Direction

Having established a process for converting Jupyter notebooks into web application use cases, the platform is now well positioned to realise rapid implementation of future use cases. Future new use cases for implementation will be decided on and created in each new trimester and delivered iteratively over multiple sprints across the remainder of each trimester.

Design Team

1. Complete the Re-branding Guide
   - Finalise the Re-branding Guide and add to handover documentation
   - Provide to client for feedback and assessment
2. Conduct Functionality, Usability, Testing of the Site after new Use Cases are added to ensure all functionality works as intended.
   - Utilize framework report templates created during sprint 1 T1 2022
   - Mobile device testing
   - Using a virtual machine to test different operating systems and browsers
3. Penetration testing of the new GCP deployment of the live site
   - Focus on Python Vulnerabilities
4. Run stress testing on the new GCP deployment of the live site
   - Focus on Python Vulnerabilities

Web Development Team

1. Implementation of Use cases created in T2 2022
2. Implementation of the Re-branding and new logos

Data Science and Engineering Team

1. Continue to develop Domain 1: Safety and Wellbeing

2. Continue to develop Domain 2: Environment and Sustainability

3. Continue to develop Domain 3: Business and Activity

4. Migration of Open Data from SOCRATA to another open data platform provider

5. Migration of flat file data sources into a relational database for improved performance of the search function

It should be noted that all scope shown for 2022 has been proposed by the City of Melbourne Open Data Project team but has not yet been ratified by the City of Melbourne. This roadmap will serve as a starting point for discussion and agreement of scope with the City of Melbourne. Figure 6.1 below illustrates the most significant deliverables completed and anticipated across T1 2022 and into T2 & T3 2022.

Figure 6.1: Roadmap for T2 2022-T3 2022
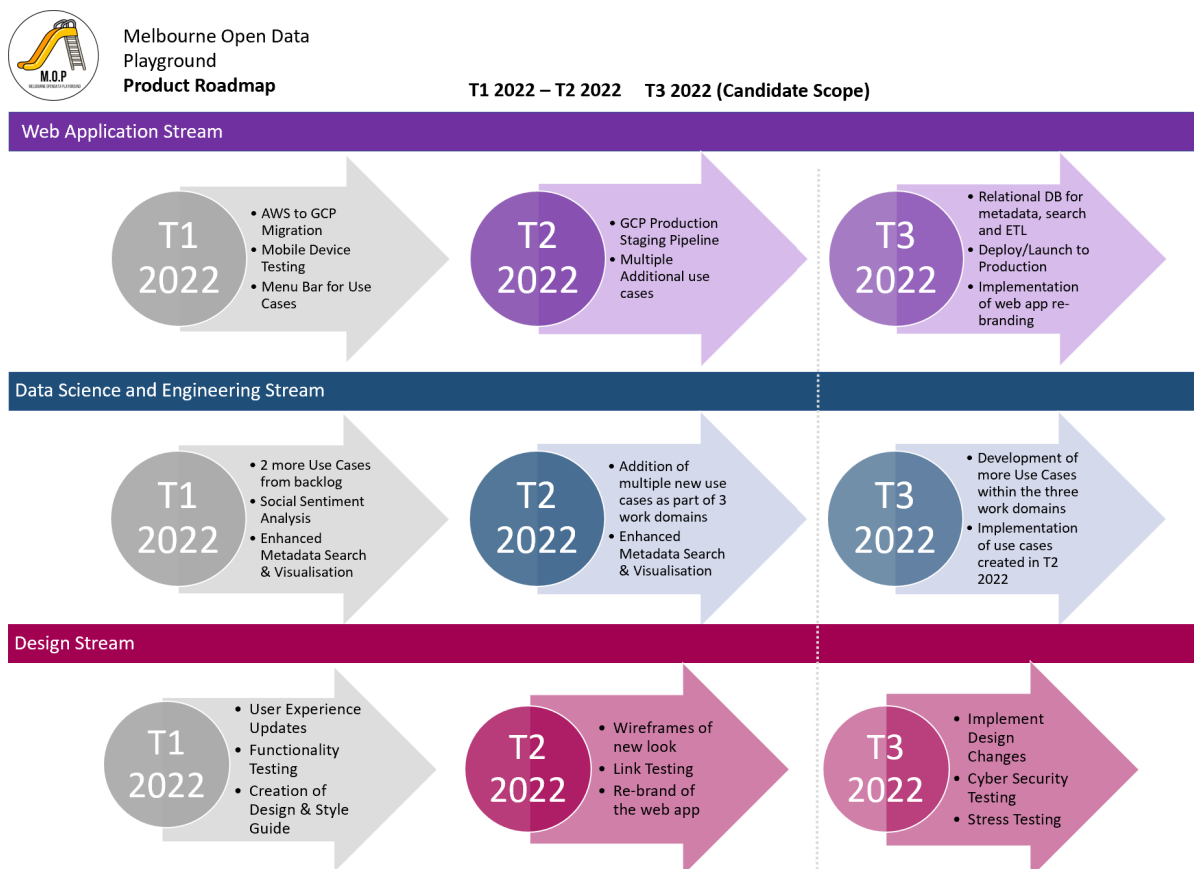
6. Open Issues

Interactivity Concerns in Notebooks

The spot parking problem use case utilises a third-party service (Binder) to initialise interactivity. The time for initialisation ranges from a few seconds up to a minute. The delay has a negative impact on the user experience and is antithetical to the streamlined product that the tribe is hoping to develop. Future squads may wish to explore alternative techniques to enable this level of interactivity including cloud service hosting of notebooks or other possible solutions. Trimester 1 2022 project team decided that this use case should be retired.

Handling user feedback for website visitors

During the client feedback session at the end of Trimester 2 2022 the client suggested developing a way to handle feedback or queries made by visitors to the MOP website. Future teams may wish to investigate avenues such as building a feedback form into the website, or utilising GitHub's Issues feature.

7. Product Architecture

7.1. Technology Stack

The teams have different workflows and goals along with different technologies and tools. Some common technologies, such as Python and HTML, help with the integration of Data Science team generated use cases into the web application by the Web Development Team. The technologies used by each team are listed below.

7.1.1. DATASCI Team

- **General - Python, SodaPy, Pandas, NumPy**: The DS Team works with the powerful, open-source Python language and its well-known utility libraries such as NumPy and Pandas. SodaPy is also used to access Melbourne Open Data through the Socrata API.

- **NLP Libraries - PyLDAvis, NLTK, Spacy, Genism:** Some Natural Language processing libraries may be used for future work in the backlog.

- **Geospatial Libraries - GeoPy, Shapely, GeoPandas, Folium, Mapbox & Plotly:** These libraries are used for the various mapping tools and visualisations used in our use-cases.

- **IDE - Jupyter Notebooks:** Jupyter Notebooks are the tool of choice for data scientists working with Python, allowing us to create and share documents that integrate live code, equations, computational output, visualizations, and other multimedia, along with explanatory text in a single document. Notebooks are created by the DS Team for each use-case, which can be converted to HTML by the WEB Team to display on the site.

7.1.2. DESIGN Team

- **Front end - JavaScript, HTML, CSS:** The website content, styling, and functionality such as navbar, search input, and clickable buttons are all coded using these ubiquitous tools.

- **Back end - Python, Flask:** In the backend, the webapp runs on Flask, a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or other components where pre-existing third-party libraries provide these functions.

- **Security - Flask-Talisman:** Talisman is a small Flask extension that handles setting HTTP headers that can help protect against a few common web application security issues. **NMAP, SQLMap, Nikito**: Penetration testing tools used with Kali Linux to test the security of   the   website.

City of Melbourne
Open Data

T2 2022

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GCP Cyber Security Features: The use to several in-built GCP features; API gateway, Cloud Build, Web app, Google Risk Protection Program and container registry.

7.1.3. WEBDEV Team

- **Frontend - JavaScript, HTML, CSS:** The website content, styling, and functionality such as navbar, search input, and clickable buttons are all coded using these ubiquitous tools.

- **Backend - Python, Flask:** In the backend, the webapp runs on Flask, a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or other components where pre-existing third-party libraries provide these functions.

- **Security - Flask-Talisman:** Talisman is a small Flask extension that handles setting HTTP headers that can help protect against a few common web application security issues.

- **Deployments - Docker, AWS, Google Cloud Platform (GCP):** Docker is the most popular solution for creating and working with containers. Currently the team employees the use of GCP and their *Cloud Run* service. There are many other services available in these Cloud Providers that we can use as we expand the project.

- **IDE - Visual Studio Code:** Visual Studio Code is a lightweight code editor which the WEB Team uses for coding in the webapp. It allows for running the Flask server in a local development environment so we can see changes live in a browser, and it also has several useful extensions for working with Git, debugging, etc.

8. Project Links

[1] Link to City of Melbourne MS Teams Channels Files

Chameleon-CityOfMelbourne

[2] Link to the project showcase video

Trimester 1 2022 Video: **https://video.deakin.edu.au/media/t/1_tu93x3dv**

Trimester 2 2022 Video: **https://video.deakin.edu.au/media/t/1_rr5rh14y**

[3] Link to our Trello board (T1/2022)

Melbourne City | Trello

[4] Link to the live website (T1/2022)

https://master-mop-busaytgm.ts.gateway.dev/

[6] Link to GitHub Accounts and Repositories

Chameleon Company account: https://github.com/Chameleon-company
MOP Community repository: https://github.com/Chameleon-company/MOP
MOP Code repository: https://github.com/Chameleon-company/MOP-Code
Chameleon Handover Documentation repository:
https://github.com/Chameleon-company/Chameleon-Handover-Documents