Requirement Analysis for Business Analytics

GeoDirectory

Problem Statement: There is no live navigation within the App for GeoFind IT and Lack of User Activity storing inside the database to provide personalised recommendations.

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Framework: Agile

Methodology: Scrum

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Under the Guidance of

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GeoDirectory

About Company:
Experts in location address data They have been in operation for over 20 years providing a wide range of address data products and services to organisations of all sizes to convert data into a profit-making resource.

Who?

Recognizing that data is an organisation's biggest asset, GeoDirectory was jointly established by A Post and Tailte Éireann. A post-with 5,600 delivery staff on the ground, has an intimate knowledge of every building in every village, town and city in the Republic of Ireland Tailte Éireann - who provide a property registration system, property valuation service, and national mapping and surveying infrastructure for the State, has thoroughly mapped the Republic of Ireland over the past 150 years and has unmatched geographical expertise.

What ?
GeoDirectory has created and now manages a definitive reference dictionary of addresses for all 1.9 million buildings that receive post in the Republic of Ireland, assigning them with precise postal and geographic addresses, ensuring location accuracy of 1 square metre.

How ?
This is done by a team of data scientists and technology experts who combine the manpower of A Post with Tailte Éireann’s cutting-edge technology. Together they build and maintain Ireland’s most comprehensive address database.

Why

Their data will grow the practicality and value of your own existing data by creating opportunities and insights to grow your revenues and business, providing a profitable asset on your balance sheet. When you know your data is accurate and reliable, you can be confident in the delivery of your services.

GeoDirectory gets all this data in a few diverse ways:

From An Post: An Post is like the postal service in Ireland. They have workers who deliver mail to every building in the country. These workers tell GeoDirectory about new buildings or changes to existing ones. From Tailte Éireann: This is another organisation that helps with maps and geography in Ireland. They have special technology and knowledge about different areas. They also help GeoDirectory update their information about buildings and addresses.

From Public Sources: GeoDirectory also uses information from public sources like government databases or census data. This helps them make sure their information is accurate and up to date. From Businesses: Sometimes, businesses share their own address information with GeoDirectory to make sure it is correct. This helps GeoDirectory keep their database accurate. By combining all this information from diverse sources, GeoDirectory creates a big database with lots of details about addresses, buildings, and businesses in Ireland. Then, they use this database to provide their services to other businesses and organisations.

Problem Statement

GeoFindIT is their published APP - in both AppStore(iOS) and Playstore (Android). While software works seamlessly, within the Geodirectory ecosystem, it lacks live navigation functionality and is filled with functional bugs, hindering users ability to efficiently navigate and discover desired locations seamlessly.

1. Users currently facing challenges in accessing real time navigation guidance within the mobile application.
2. This resulted in overall user experience deterioration and platforms effectiveness in facilitating location based searches and directions.
3. The current build of the app live in the appstore and playstore are filled with functional bugs and user responsiveness.
4. This diminishes the app's competitive edge in the navigation market.

Thus arises a critical need to integrate the navigation and fix bugs to GeoFindIT App, in order to enhance the user experience and ensure the app remains a valuable tool for location discovery and navigation.

Operational Data Schema:

1. Address Data Management:

    a. Building address - Company stores information about buildings including location,EIRCODE, building type and status.

    b. Business Address - Company stores data related to businesses such as business classification website , email address, number of employees, turnover, etc.

    c. Residential Address - Company holds details about residential buildings including building types, date of build, occupancy status,etc.

    d. Geo Location - Stores precise geographical coordinates

2. Product and Service Information:

    a. Product Catalogue:
        i. GeoAddress Online,
        ii. GeoPeople
        iii. GeoAddress Checked
        iv. GeoBuilding Intel
        v. GeoAddress Fix
        vi. GeoAddress SmartData
        vii. GeoFindIT
        viii. GeoData Consulted

    b. Product Usage Data:

        i. GeoFindIT - Its an established App that helps users to find new places and tourist attractions nearby like parks, restaurants, EV Chargers, Hospitals, colleges, health institutions, bus stops and public transports.

        ii. This app is created with a motive to help people in the Republic of Ireland to explore all the areas in Ireland.

3. Customer Data:

    a. Customer Profile - The customer profile stores information about GeoDirectory's customers', including contact details, usage history and preferences.

b. Customer Feedback - contains feedback and reviews given by the customers.

4. Operational Data:

    a. Internal Operations - They track internal operational activities such as data storing, data processing, system maintenance and customer support interactions.

    b. Data Sources
        i. Ann Post Data - This includes data provided by An Post, such as building information and postal delivery data.

        ii. Tailte Eireann Data - contains data from Tailte Eireann, including geographical expertise and mapping data.

JUSTIFICATION

1. **Modularity**:

    We are using modularity to keep the code for maintenance and development of the complex software. This will help with testing and debugging of the code which can also later be re-purposed. (reusability of the code is possible.) Moreover, we can have this code maintained by any other developer by keeping this in separate modules. Proper documentation will be followed along with modularity for future purposes. A set of modularization conventions that describe how the individual modules work together, and how they can be modified or extended.

2. **Data Integrity:**

    Data cannot be the same every time. It would be traversed via different methods through its lifecycle. This would put the data at risk or get compromised. This is where data integrity would play its part. Data integrity includes following GDPR rules and regulation to protect this from happening and being recorded exactly as intended. There are strict new rules about what

constitutes consent from a data subject to process their information. Consent must be ‘freely given, specific, informed and unambiguous.’ Requests for consent must be ‘clearly distinguishable from the other matters’ and presented in “clear and plain language.”

3. **Scalability:**

   With the ever increasing data, there would definitely be a need to expand and grow the database. The modular schema will come handy in this scenario for easier expansion and modification of specific components thus enhancing the Program and scaling up. This provides flexibility in scaling up or out depending on the specific needs and growth patterns of GeoDirectory's Operations. This evolution in the schema can be tracked involving techniques Like versioning, backward compatibility and schema migrations for future Expansion of the database.

4. **Performance:**

   (With a well structured schema, queries and data retrieval can be optimised for better performance.)
   With a well structured schema we would get optimised queries and data retrievals making the app more efficient in performance. With modularisation and smaller and more managerial pieces, improves query performance. The most desirable outcome would be faster response time of the app by implementing concurrency controls,application performance monitoring tools, etc.

5. **Flexibility:**

   The schema allows for flexibility in accommodating new data types and relationships as Geodirectory evolves.Also, with this schema if there are any changes needed we can amend the schema.

Requirements Elicitation Plan: Here we present a comprehensive plan for elicitation.

For the entire Requirement gathering from our Scrum Team is planning to dedicate around 30 business working days (around 8 weeks). This Entire Timeline consists of various process such as:

1. **Stakeholder Identification and Finalization: (5 Working Days)**

    a. During this period the product owner will Identify and map out all the Key stakeholder within the company and external resources this may include but not limited to Management, Developers, Scrum Master, Testing team, Data Analysts, Data Scientists, Sales and Marketing Team.

    b. Engaging StakeHolders in Early stage ensures their complete collaboration, Promotes team coordination resulting in more relevant and accurate requirements and increases adaptability.

2. **Requirement Gathering: (**8 Working Days)

    a. During this time our scrum master along with the product owner shall conduct multiple Interviews with Stakeholders to gather requirements for Upgraded Geo Find IT App. This may include but not limited to several questionnaires involving both open ended questions with multiple choices and Answerable questions helping our team in mapping out requirements by correlating with real time scenarios.

    b. Distributing surveys to a wider group of audience consisting of various demographics which may include but not limited to existing Geo Find IT app users and potential audiences group to gather feedback on their experiences, User reviews, Bugs and Expected features.

    c. Product Owner also organises a focus group to facilitate discussions among stakeholders, development team, management and delve much deeper into their opinions to gather valuable insights meanwhile understanding their pain points in using existing Navigation Apps.

    d. Using this combination of Interviews, surveys and focus groups allows us to have a complete understanding of stakeholder needs and preferences from various perspectives.

3. **Requirement Documentation : (**7 Working Days)

    a. Product owner along with Scrum team, Compile and document all gathered requirements into comprehensive requirements documents such as Business requirements document, Functional requirements

document and Technical requirements documents. This document shall serve as a reference point throughout the development process and may need a scope change if there is change in a requirement or product backlog.

b. The gathered requirements are prioritised and organised based on stakeholder input, feasibility and impact on user experience. Review of requirement documents with stakeholders to ensure the accuracy and alignment with their specification.

c. This process of documenting ensures the scope is always on focus and ensures there is no deviation in the development process. The process of prioritising requirements helps the team manage expectations, Identity critical features and Complete optimisation of resources.

4. **Requirement Validation, Verification and Freezing :(**5 Working Days)

a. The product Owner along with scrum master and scrum team, Conduct validation sessions with stakeholders to review the documented requirements and confirm their accuracy and freeze the requirements after thorough validation and stakeholder approval to ensure stability for subsequent project phases.

b. Scrum team also Verify requirements against industry best practices and regulatory standards to ensure compliance. Testing team will Perform usability testing and user acceptance testing (UAT) with representative users to validate the proposed features and functionality.

c. Incorporate feedback from validation sessions and Update the document to reflect any changes or additions based on stakeholder input and testing outcomes.

d. This process of Validation, verification and freezing activities ensure the documented requirements are accurate, feasible and aligned with business objectives reducing the risk of unwanted development timeline and resource usage. Requirement freezing after thorough validation ensures stability for subsequent project phases, minimising the likelihood of scope deviation.

5. **Development Initiation & Progress Tracking with Jira : (**15 Working Days)

a. Language Used - React Native and Node JS

b. Database Used - MongoDB

c. Hosting - AWS for both Staging and Production Environment

d. The product owner along with Scrum Master and Scrum Team, Shall Create a new Jira Project for Project Management and ensure all key stakeholders are given necessary access to Jira to visualise the development progress.

e. The entire development takes place with 5 epics and multiple stores under those epics corresponding multiple sprints which are developed and monitored frequently and tested as soon as the Sprint is reached and approved.

f. The Several sprint progress is tracked and various charts are made to display the development team progress and Financial forecast to showcase resource and fund utilisation.

g. The reason to use Jira for Project management is we are adhering to Scrum Workflow and Jira facilitates deeper workflow automation and realtime reporting ensuring efficient and transparent sprints through the software development life cycle.

6. **Testing and Launch Phase : (**5 Working days**)**

a. The Scrum external testing team is being deployed to Complete entire Testing from performance to regression tests in order to ensure the product is free of bugs and actually addresses all the pain points listed in the requirements document and improves user experience.

b. The Application from Production Environment is moved to staging environment along with Database and Necessary changes are done to Database to ensure seamless flow of User access of both Existing users and new users.

Initial requirements and documentation:

To Integrate Navigation functionality inside Geo FIND IT Application and Develop a Machine Learning model that understands user usage history and give valuable real time feedback and suggestions to improve experiences we have gathered a focus group of 3 members Product owner, Scrum Master and Scrum development Team.

Functional requirements:

- Home page Modification: (EPIC)

    - I Am an User i need to have my personal searches in my account - **User Login**
    - I Am an User i need to have Landmarks details near me - **Updated Landmarks**
    - I Am an user and i could be able to search places i want to go to or i would like to visit - **Search section with actionable results**
    - I Am an User. I need to know what my range of field maps is covering and my direction of viewing - **User GPS Radius limit implementation.**
    - I Am an user with special abilities and i would require assistance to use the app - **Listen feature enhancement**
    - I Am an user living in Ireland with unpredictable weather. I would require a weather field to show me current status and upcoming predicted weathers - **Weather field should reflect updated weather conditions and Real Time weather results**.

- When clicked on Pin: (EPIC)

    - I Am an user i need area details when i click on a certain location, building and so on - **Info for pinned areas (dynamic)**
    - I Am an user i need to use live navigation for my travel needs – I would require (accurate coordinates, travel time and Distance, Time data, mode of transport, Shortest path, Traffic) - **Live Navigation**
    - I am an user. I would like to see user reviews and average rating for the place i am visiting - **Realtime reviews of selected areas.**
    - I Am an user who need Directions inside the GeoFindIT app rather than being redirected to google maps – **Directions Inside app (rather than google maps)**
    - I Am an user i need proper details on my Favourites section of areas - **Favourites section revamped**
    - I Am a user i need to contact certain places in my map or i find in map for which i need contact Info to that place – **Contact Info for selected Places**

- Play GeoFindIT: (EPIC)

    - I Am an user who frequently use play GeoFindIT to find places in ireland but lack of images of that places is deal breaker for me dedicated option to update images- **Place images needs to be fixed**
    - I am an user who uses play GeofindIT but i could not find any places with detail info-**More detailed info about place**

    - I Am an user i need way to engage with the people who using GeoFind IT like a Leader board -**Make game more interactive**
    - I am an user, i can update images but i need a driving or motive factor to do so and deeper flexibility while playing game – **Incentives to People to update images**

- Added Functionalities: (EPIC)

    - I am a user, i am sharing a location or a image with geoFindIT and need other users to find the same location or a person does not have App, it can show an option to download the App – Share link with app download and view location permissions
    - I Am an User and I am sharing my user data in order to get Personalised feedback on the app which may include recently visited places, recently viewed and most visited places and my favourites. Using my user data provide me with personalised recommendations to improve my user experience.

- Special Permissions: (Extra Requirements)
    - Permissions for Location
    - Permissions for mobile Data
    - Permissions for Camera and Mic

Non – Functional Requirements:

1. The accuracy of the maps must be around 30 metres of the radius of the selected place.

2. The usability of the application must be intuitive.

3. Simplicity of the application.

4. The performance must be within 2 seconds when asked about the reference.

5. Scalability: The application must continue with work for 1000 sessions for the users.

6. Security: The login information for the users must be protected and details of the places should be provided to authenticated users only

7. Accessibility: The users should be able to follow WCAG 2.1 guidelines to ensure accessibility for disabled people. The Listen feature should support screen readers for the visually impaired.

8. Compatibility: The application is able to work with both ANDROID as well as iOS platforms with various browsers like Mozilla, Chrome, Firefox, internet explorer (MS).

9. User Experience: The application should be clearly usable and with lively colours.

10. Maintainability: It must be easier to support having the requirements documented for future references.

11. Integration: The google API, weather API must be easily available to be integrated within the application. We should have seamless functionality with the application.

12. Reliability: The application must have 99.99% uptime and there should not be any data resiliency issues for the users.

13. Localization: The application must be able to cater to all the users of various demographics.

Data Storing :

- When Considering Data Transformation from Operational to Analytical, The Data gathered from the user needs to be stored inside a Database. This process is done to store data of users which may contain but not limited to existing users. The Database checks for User credentials and cross verifies all the data before it does classify the user as Existing or New user.

- The Second Reason to Use Database is to store user pattern Data adhering to GDPR rules all the user data are stored with user permission and only used to improve user experience and help users with valuable suggestions.

- Database Used - MONGODB : The Reason to use MONGODB is it Offers flexible schema where data can be stored as Document and not necessarily restricted to Tables like SQL, Support for JSON and Nested Data, Flexible API's that offer access to existing databases or Integrating other databases Quick and efficient. MongoDB is a noSQL Database which increases the efficiency when storing and updating Data inside the Database through the distribution of workload among various Shard's. The very last reason is to reduce expenses in case of Database management, Where MONGODB has less price compared to Other Databases.

Data Cleaning :

- The stored data needs to be cleaned as it may have errors, inconsistencies and standing out data points in the operational data.

- Standardised formats for dates, Remove unwanted correlating features to ensure data consistency and Integrity.

- Data can be Summarised into valuable Key performance Indicators or metrics related to our objective of providing users with valuable information from gathering user information and patterns.

Data Transformation :

- The Collected Data from users like recently visited places and favourites and reviews in recent places along with recent commutes are transformed into valuable insights by implementing Regression Analysis.

- Ensure the Transformation Algorithm is Dynamic where it accounts for new variables and constantly changing Key performance indicators and Train model accordingly to adapt with growing user needs and provide users with valuable insights and recommendations.

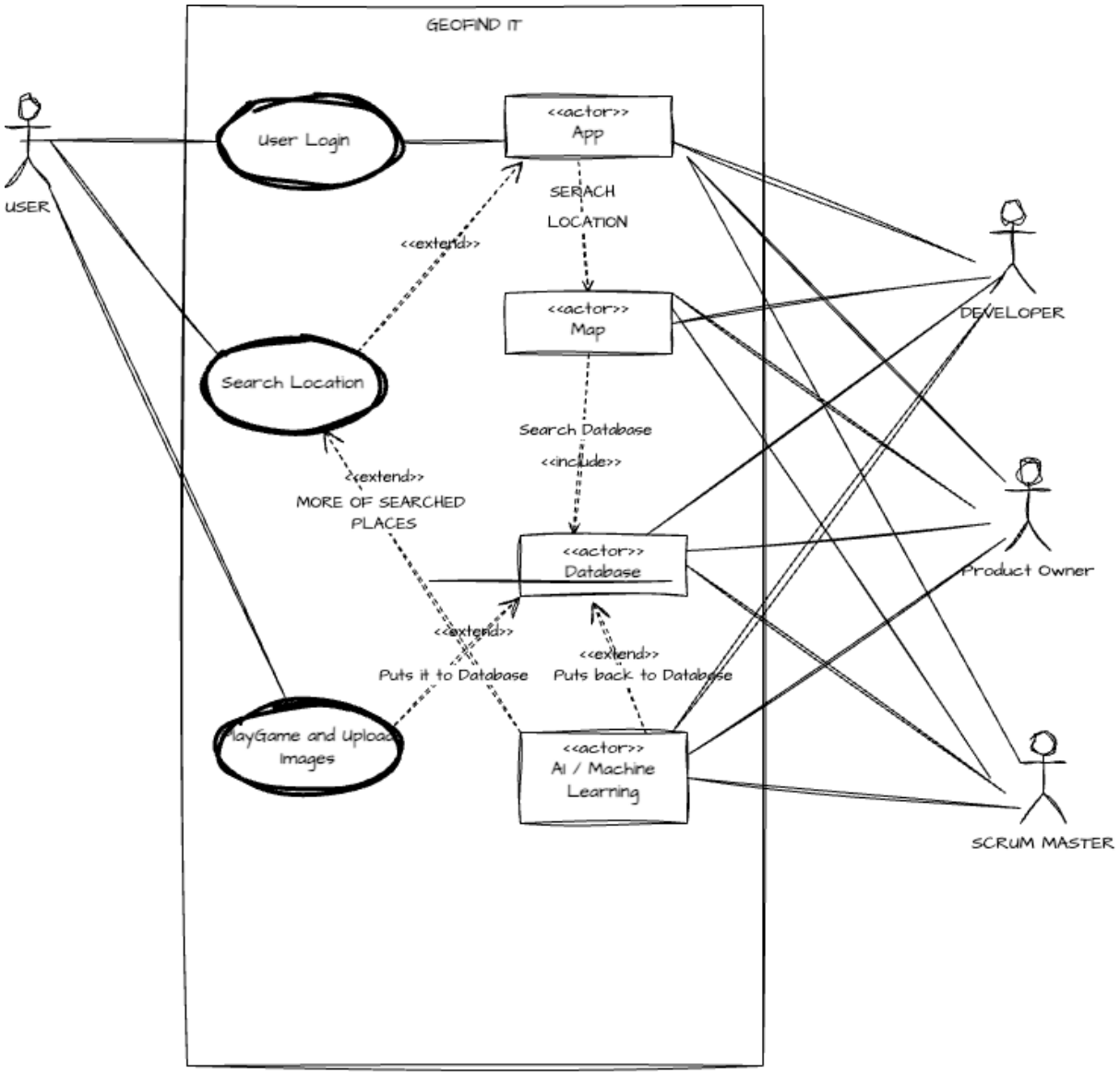
Future Scalability :

- The Data transformation process is a constantly evolving process and adhering to predicted user growth the data of users may have a lot of variance and feature points, The Data model should need to be built with embedded capability to accommodate growing volumes of user data and constantly dynamic analytical requirements.

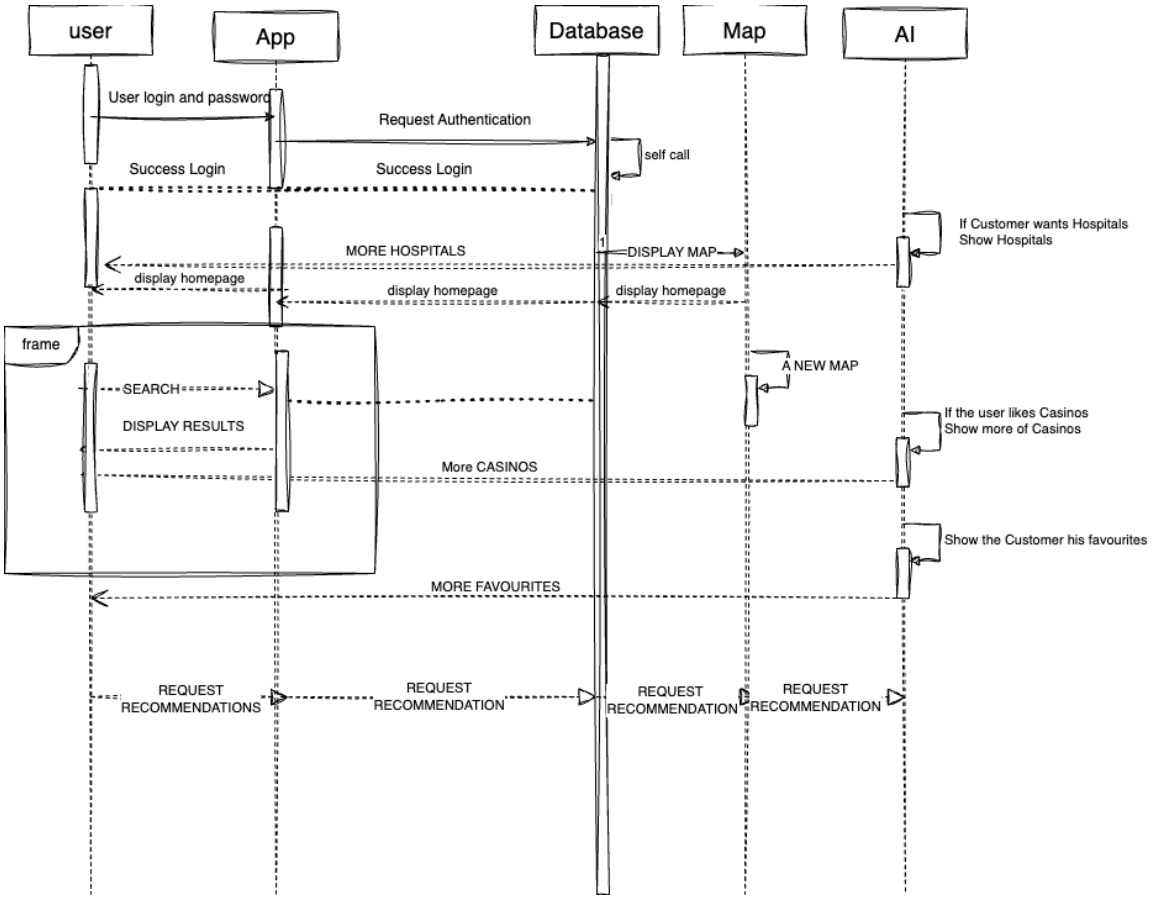
- To ensure the model has High Scalability, Our outsourced team of expert developers are doing multiple tests on various aspects like system

performance and resource utilisation to optimise the entire processing time and make it efficient. At the same time the MongoDB hosted in AWS provides Optimal Load Balancing to our Microservices Architecture, the Database stays active in the case of huge data load and user volumes.

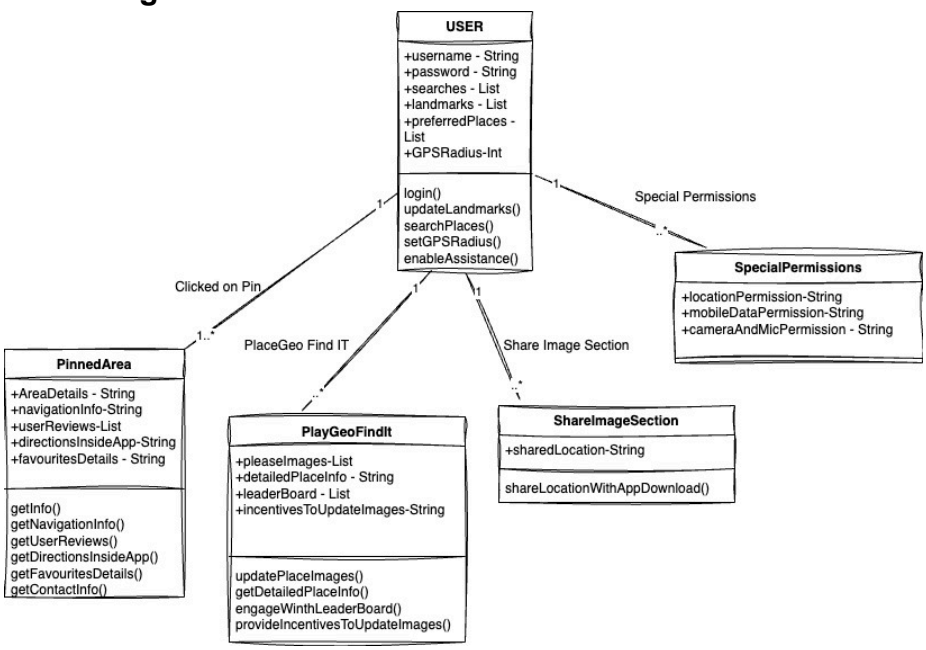
Use Case Diagram :



Sequence Diagram for GeoFindIT :



Case Diagram:



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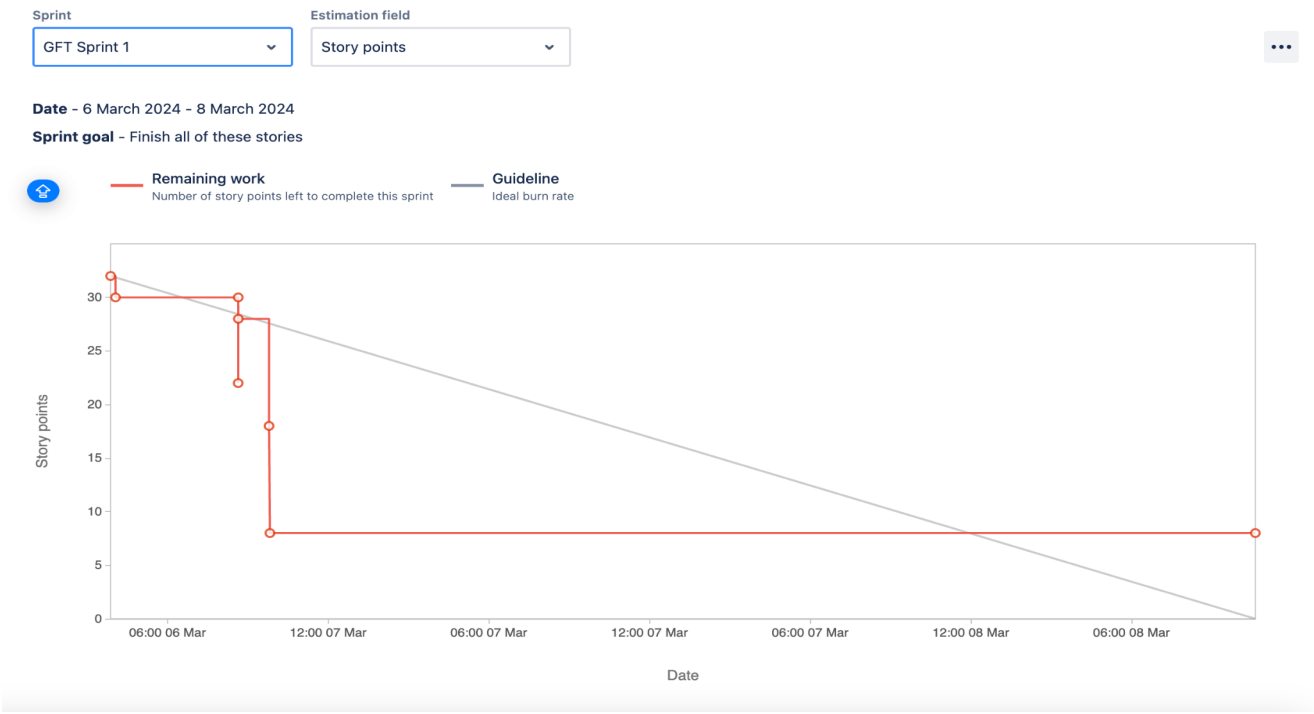

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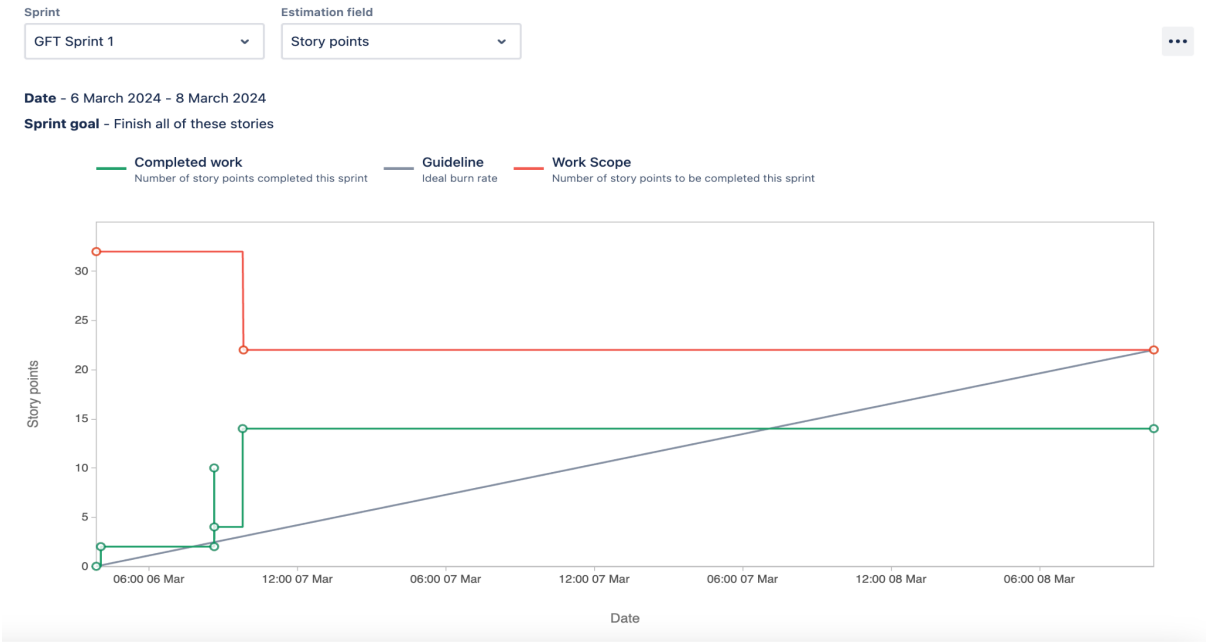

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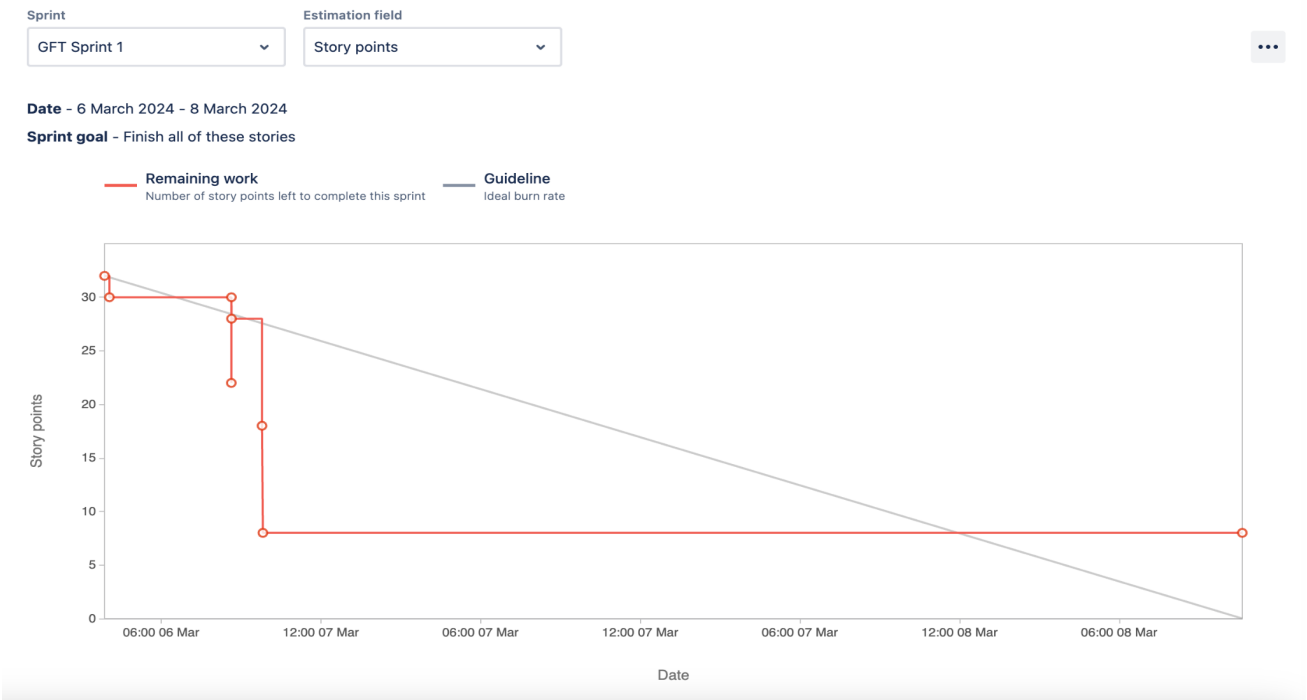

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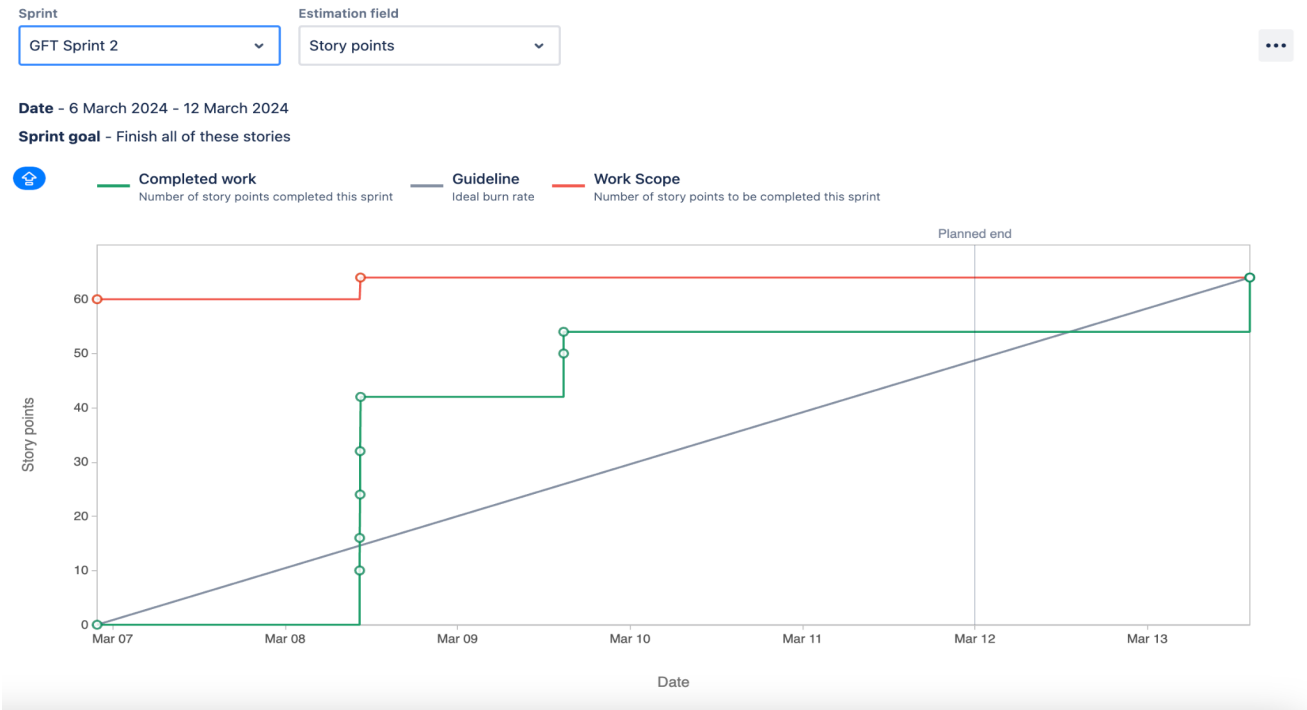

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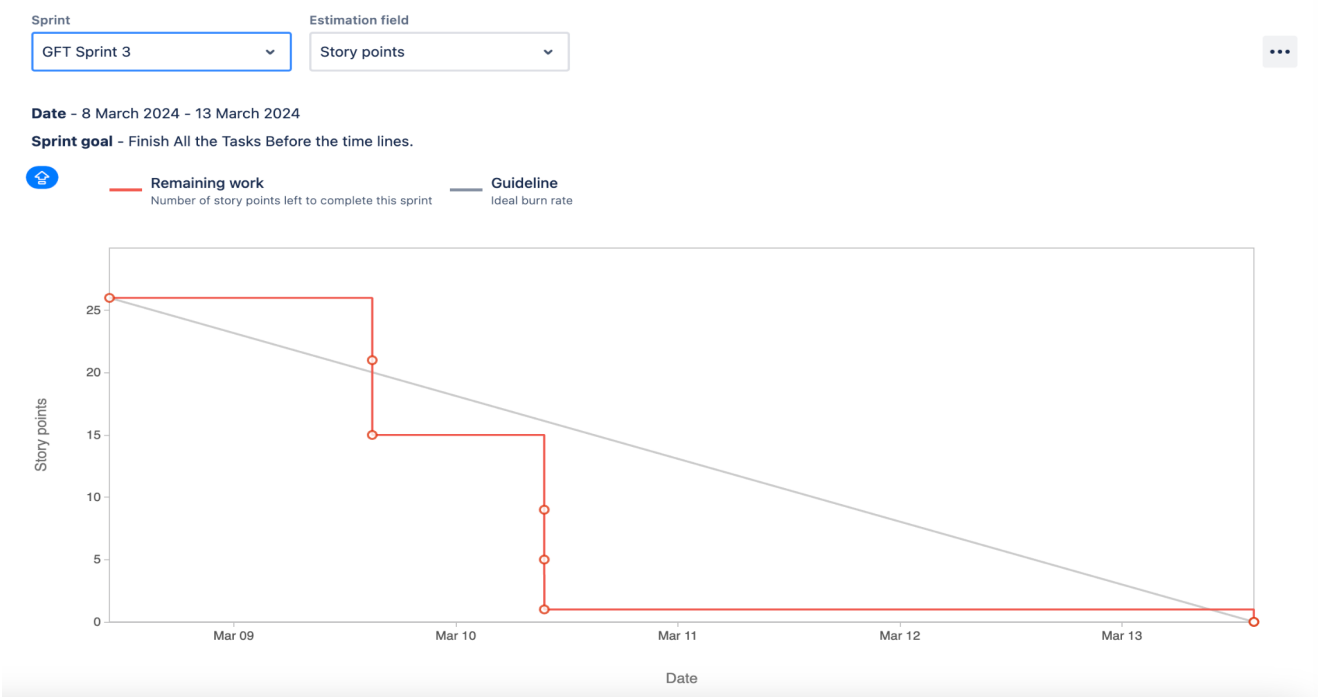

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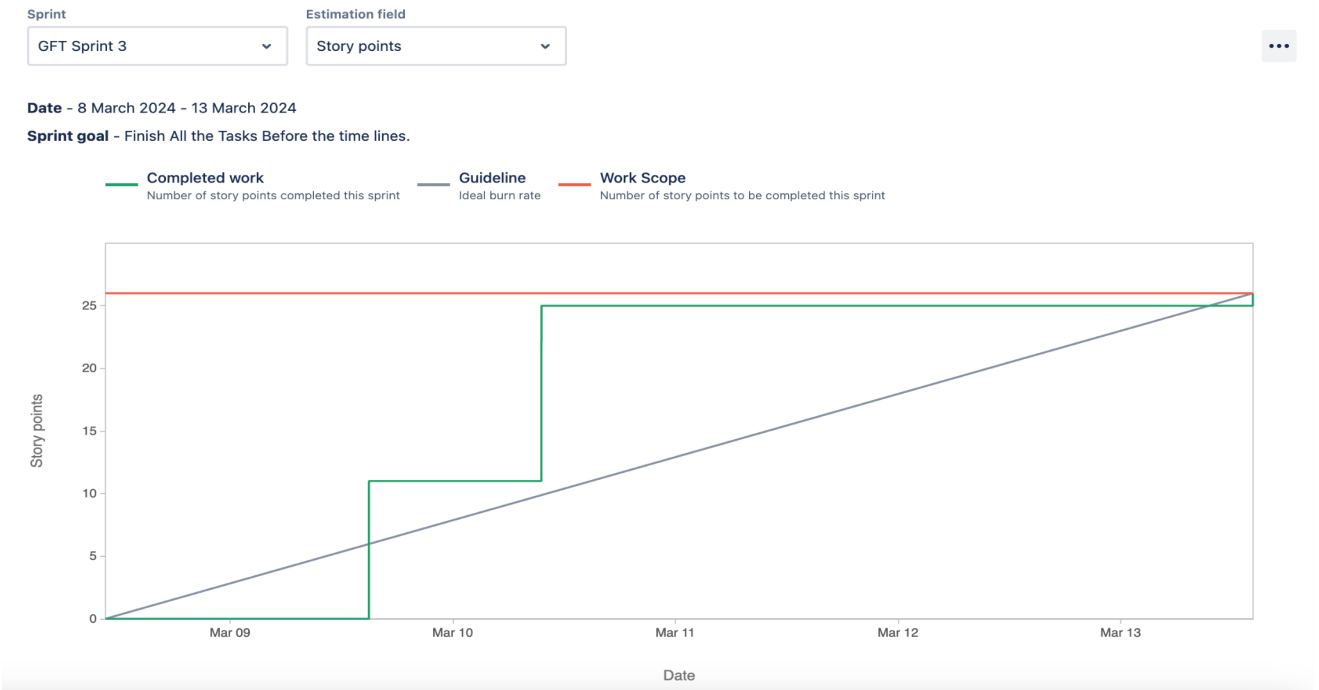

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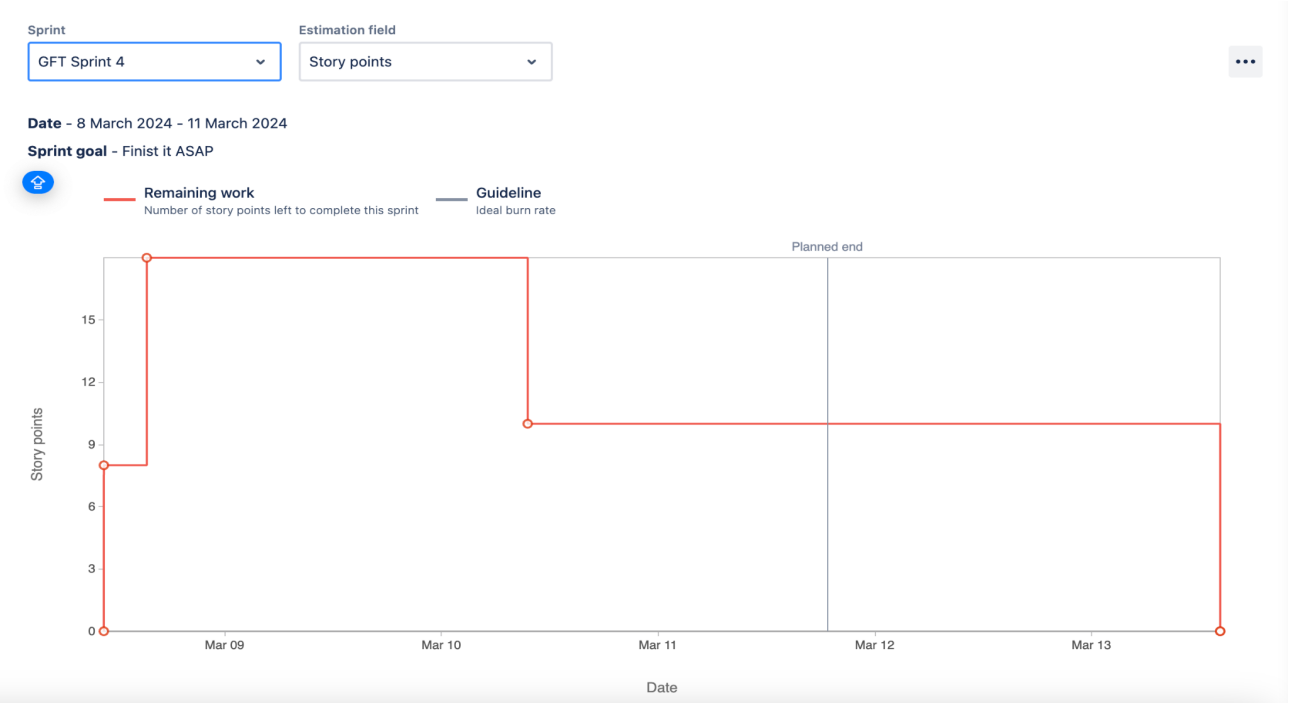

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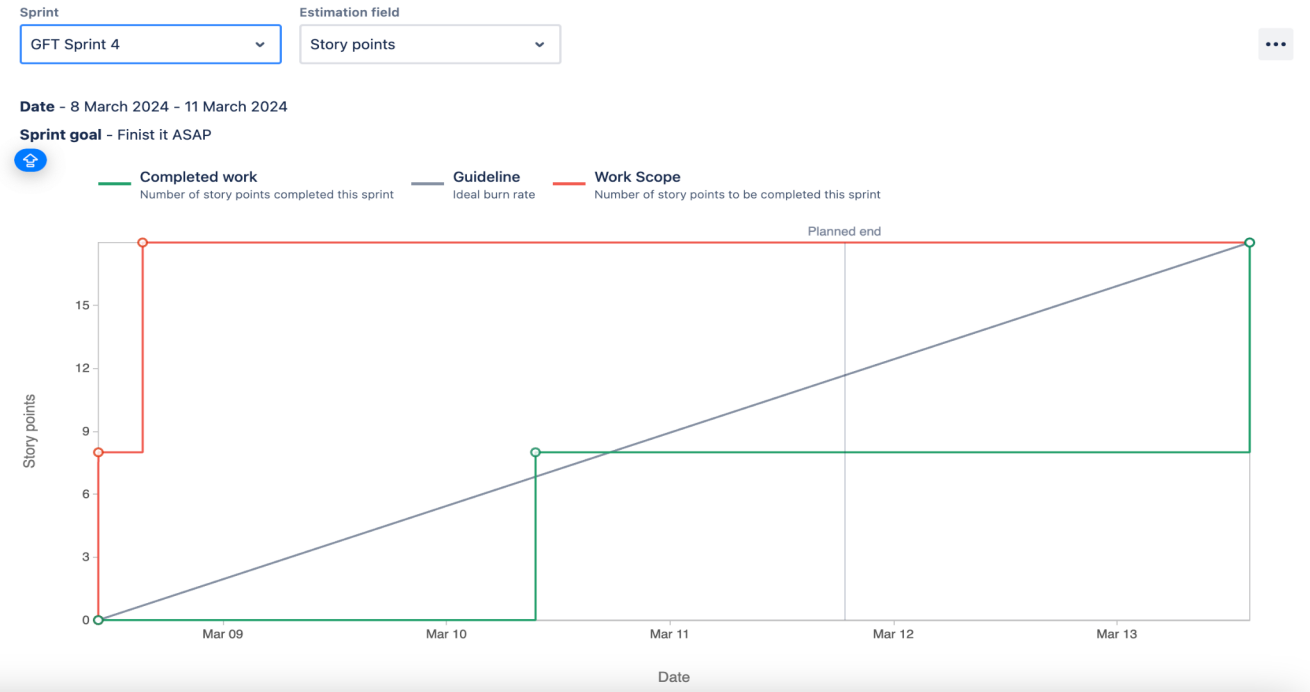
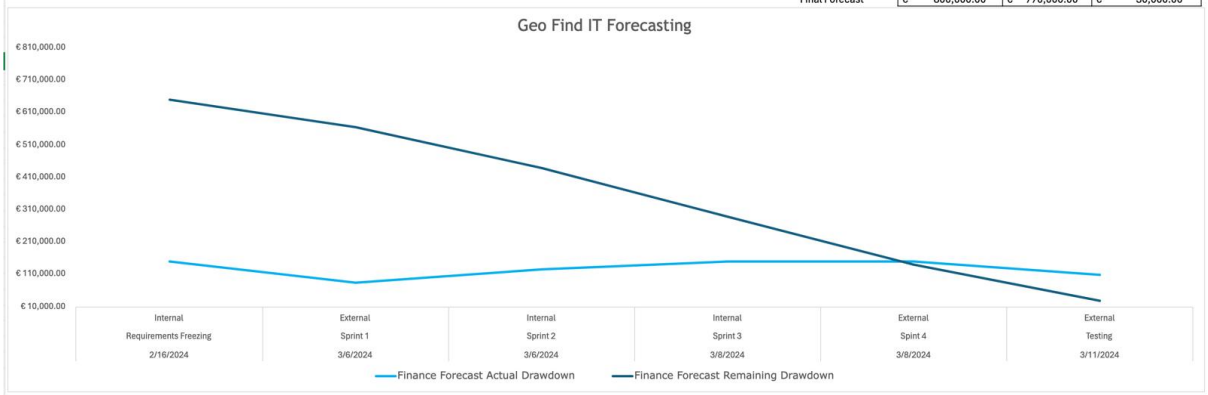


Following the Jira Task, A detailed Finance Forecasting is done for the entire project, which takes various factors into account from resource to sprint cost and correlated with the existing sprints this chart provides a detailed Idea how the Drawdown Allocation is done from Actual Project Allocation and various

drawdown is projected in a detailed manner for StakeHolders' and PMOs' understanding.

Project Name	Project Code	Assigned Product Owner	Assigned Scrum master	Assigned Scrum Development Team	Created Date	Ending Date	Sprint	Resources	Finance Forecast			
									Project Allocation	Drawdown Allocated	Actual Drawdown	Remaining Drawdown
GeoFindIt(GFT)	PR12367	Akash	Mrinal	Neha	2/16/2024	3/4/2024	Requirements Freezing	Internal	€ 1,000,000.00	€ 800,000.00	€ 150,000.00	€ 650,000.00
					3/6/2024	3/8/2024	Sprint 1	External			€ 85,000.00	€ 565,000.00
					3/6/2024	3/12/2024	Sprint 2	Internal			€ 125,000.00	€ 440,000.00
					3/8/2024	3/13/2024	Sprint 3	Internal			€ 150,000.00	€ 290,000.00
					3/8/2024	3/11/2024	Spint 4	External			€ 150,000.00	€ 140,000.00
					3/11/2024	3/16/2024	Testing	External			€ 110,000.00	€ 30,000.00
									Final Forecast	€ 800,000.00	€ 770,000.00	€ 30,000.00



Personal Reflective Report:

Regular Updates:

All of the Stakeholders met up on a weekly basis for Business Understanding, Requirement Gathering, Requirement freezing, Software development life cycle and its methodology are done on the specified Timelines.

Description of Contributions:

The Product Owner interacted with stakeholders and gathered the initial requirements. It began with the identification of the stakeholders and later stages were about requirements elicitation and gathering, documenting and tracking the requirements. Verification, validation and freezing of the requirements were the final stages before the development team takes over to start the project.

Challenges Faced:

We identified that there was a story “Search section with actionable result” which was a part of machine learning. In order to match the timelines for the completion of the project we had to outsource the predicted suggestions section where search sections with actionable results are added to a new sprint and development is taken over from there by the external team.

Skills Developed:
During the project the important part was to meet the timelines. Stakeholder management and Requirements Elicitation, Crisis Management were the aspects that we learned the most about project management and got the opportunity to improve upon existing skills.

Reflection on Team Dynamics:
The importance of team dynamics wherein we learned about teamwork. Collaboration between the cross functional teams.