



MIDDLE EAST TECHNICAL UNIVERSITY
DEPARTMENT OF COMPUTER ENGINEERING



SOFTWARE ARCHITECTURE DESCRIPTION (SAD)

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afetbilgi.com

Group 24

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1 Introduction

This document is the Software Architecture Description (SAD) of a website designed to help earthquake victims to acquire the necessary information and give volunteers a chance to donate to help earthquake victims. The website is called afetbilgi.com[1], developed by Middle East Technical University (METU) students and graduates.

1.1 Purpose and Objectives of afetbilgi.com

afetbilgi.com, direct translation to English is ‘disaster documentation’, is an open-source efforted project led by students from METU in Ankara, Turkiye. It aims to provide a clean, verified, and correctly classified information interface for earthquake victims and helpers alike in the aftermath of the tragic earthquake on February 6th, 2023, in Pazarcik, Turkiye. It also offers quick information using confirmed website links, maps, and address tables, along with the relevant contact details of organizations and helpers involved.

1.2 Scope

afetbilgi.com was established to offer as much information as needed by users in three main categories:

- People who are affected by the earthquake (the victims).
- Individuals/Organisations who want to help and participate in other government/private efforted procedures in the affected areas.
- People from METU who verify and checked any presented links on the websites.

The website is primarily responsible for providing tables and datasheets with website links to third-party organizations/contacts details of web places/physical locations which offer/collect help. As indicated here, these links are external and lead out to other websites(outside from afetbilgi.com) whose efforts are verified by human resolves (METU students/helpers/site administrators) on the surface-level user experience.

Given how the world is connected with the internet and phones/televised communication, the project developers aim to create a website using these advantageous characteristics via a simple interface in multiple available languages to create fast and easy use of information with no additional and unnecessary obstacles. In areas lacking internet infrastructure that might have been disturbed by the earthquake activities, the website can be distributed via printed-out PDFs, which are shareable via ordinary computers and mobiles, and hand-forwarded physical versions in the forms of leaflets and so on.

Lastly, afetbilgi.com includes a map functionality if the victim/helper has an internet connection. Any user can locate helper geolocations via terrain/road routes while also being able to quickly view extra details such as written addresses, contact phone details, and previous reviews.

1.3 Stakeholders and Their Concerns

There are three main categories of people related to afetbilgi.com:

1. **Earthquake victims/ affectees:** These individuals whom the earthquake has directly impacted seek help, support, and information to recover from the disaster. They may be looking for information on how to find shelter, food, medical assistance, and other resources that can help them get back on their feet. The website may provide them with a platform to connect with relief organizations and volunteers and access information on navigating the recovery process.
2. **Volunteers:** These individuals want to offer their time, skills, and resources to support the relief and recovery efforts. They may include local volunteers, international volunteers, and disaster response teams. The website may attract volunteers by providing information on how to get involved, where to go, and what support is needed. Their primary use of the website could be to scout places to help from outside the main areas, such as centers transporting essential needs to stricken areas like farther cities such as Ankara and Istanbul. This is the target sector for the Donate or Help category, such as via blood donation, monetary donation, physical

volunteer help, etc. Other entities such as relief organizations, government agencies, more prominent sponsors, and potential media outlets can exist within this category.

3. **Web developers, Data Collectors, and Site administrators:** These are the website creators responsible for developing, designing, and maintaining the platform. They may include web developers, designers, and other professionals involved in creating and managing the website. These stakeholders may be vested in ensuring the website is accessible, user-friendly, effective, and, most importantly, providing simple, verified information to facilitate relief and recovery efforts without any hurdles.

2 References

This document is prepared with respect to IEEE 42010-2022 [2] standard.

References

- [1] A. B. İşlem Merkezi, *Afetbilgi — afetler hakkında doğru ve güncel bilgiler*, <http://www.afetbilgi.com/>, February, 2023.
- [2] IEEE, “Iso/iec/ieee international standard for software, systems and enterprise – architecture description,” *ISO/IEC/IEEE 42010:2022(E)*, 2022. DOI: 10.1109/IEEESTD.2022.9938446. [Online]. Available: <https://ieeexplore.ieee.org/document/9938446>.

3 Glossary

4 Architectural Views

4.1 Context View

4.1.1 Stakeholders' Uses of This View

4.1.2 Context Diagram

afetbilgi.com[1] is not part of a more extensive system. It is a standalone and open-source efforted website to verify critical information in the fight against the 6 February 2023 Pazarcik Earthquake and deliver it to disaster victims and those who want to help in an understandable, concise manner in multiple languages.

This information is presented in either the form of legible tables with third-party governmental and private links or an interactable method via a map view interface. If deemed necessary, admin and maintainers can make changes to display newly created or edited data and upload it to the system upon any complaints or suggestions they may get on their contact details.

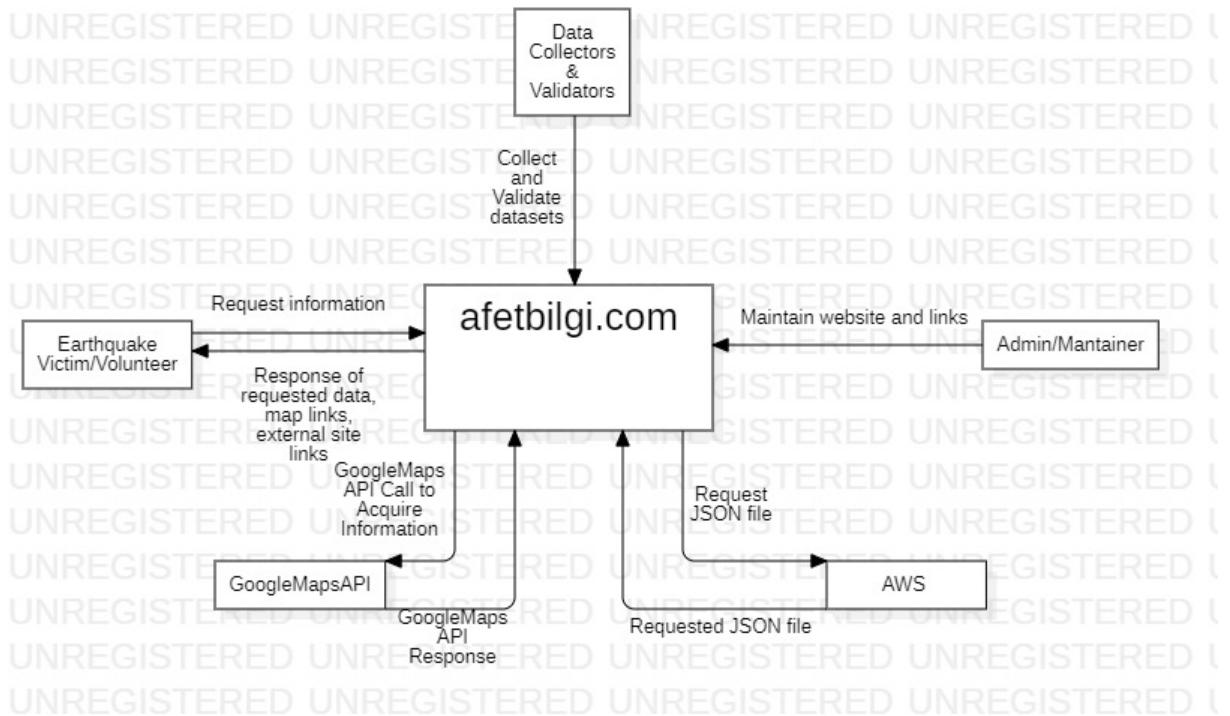


Figure 1: Context Diagram for afetbilgi.com

The afetbilgi.com consists of a combination of small physical and software parts. With the help of interfaces, these parts communicate among themselves and with the user.

4.1.3 External Interfaces

In this section, the external interfaces of the afetbilgi.com will be provided, as well as their operations and relationships.

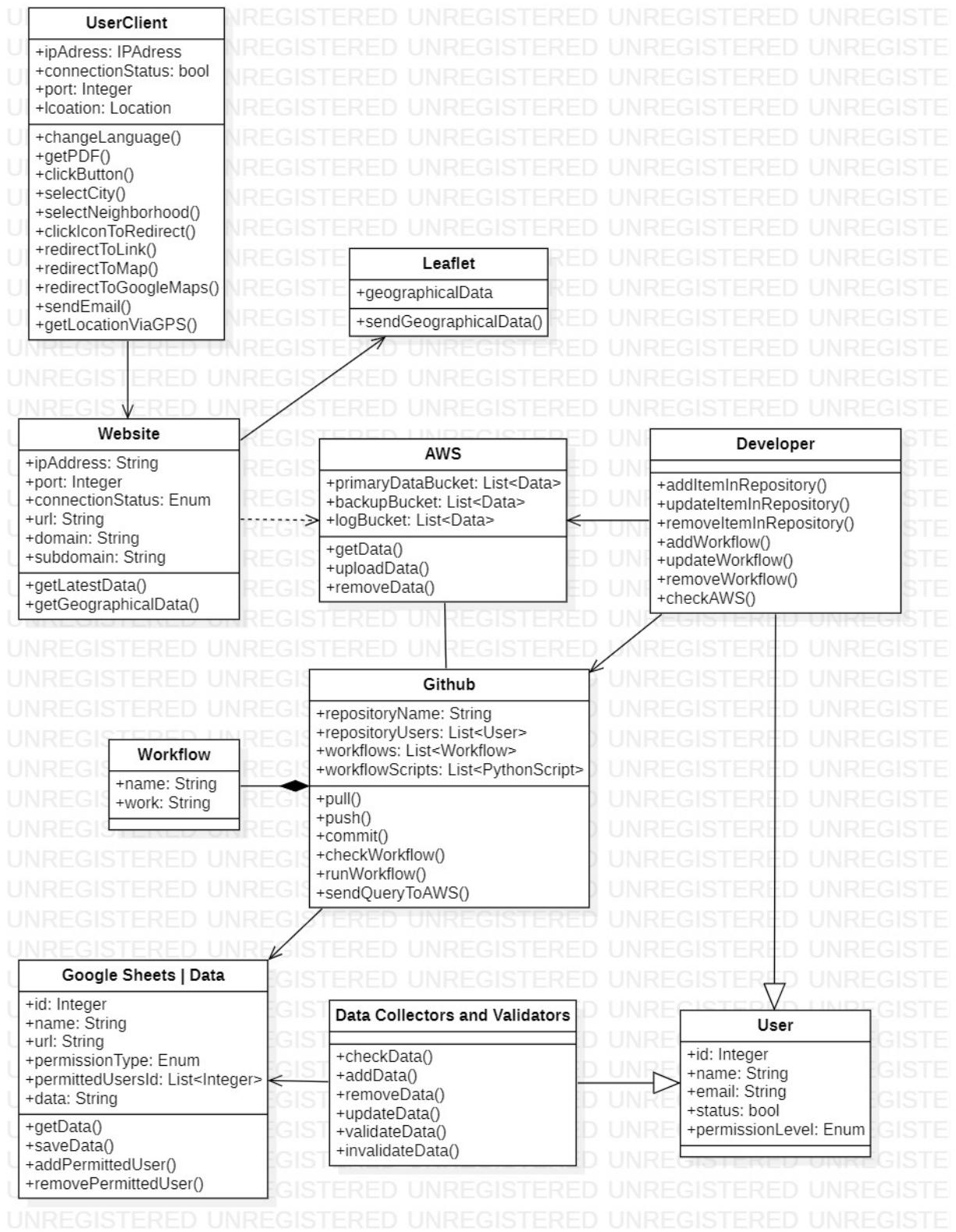


Figure 2: External Interfaces

As it can be observed from Figure 2, afetbilgi.com has multiple external interfaces. UserClient, Website, Leaflet, AWS, Developer, Google Sheets for data, Data Collectors

and Validators are external interfaces of the system. Github Repository for the afetbilgi.com may also be considered an external interface since it is generally responsible for sustainability of the system. The operations given in the diagram can be summarized as follows:

- The Data Collectors and Validators collect data and validate it. After validation, data is added into a specified data sheet in Google Sheets.
- Google Sheets mainly store the data. The data is divided into several files in Google Sheets. These sheets can be accessible for data collectors and validators.
- GitHub Repository is used for storing the source code. Additionally, the GitHub workflows of the repository check, maintain and update the website in regular basis by executing the workflows in a determined period.

Some workflows use the scripts in the repository to access sheets to get the recent data and create new updated `latest.json` and `schema.json` files. After completing the creation of these files, they are uploaded to Amazon Web Services (AWS). These workflows can be managed and updated by the developer.

- Leaflet is used for the map of the afetbilgi. There is an additional subdomain, whose link is maps.afetbilgi.com for the complete map.
- UserClient initiates the connection with the website. It has some attributes that are provided to the website and functionalities to control the website.

4.1.4 Interaction Scenarios

Two different interaction scenarios are provided:

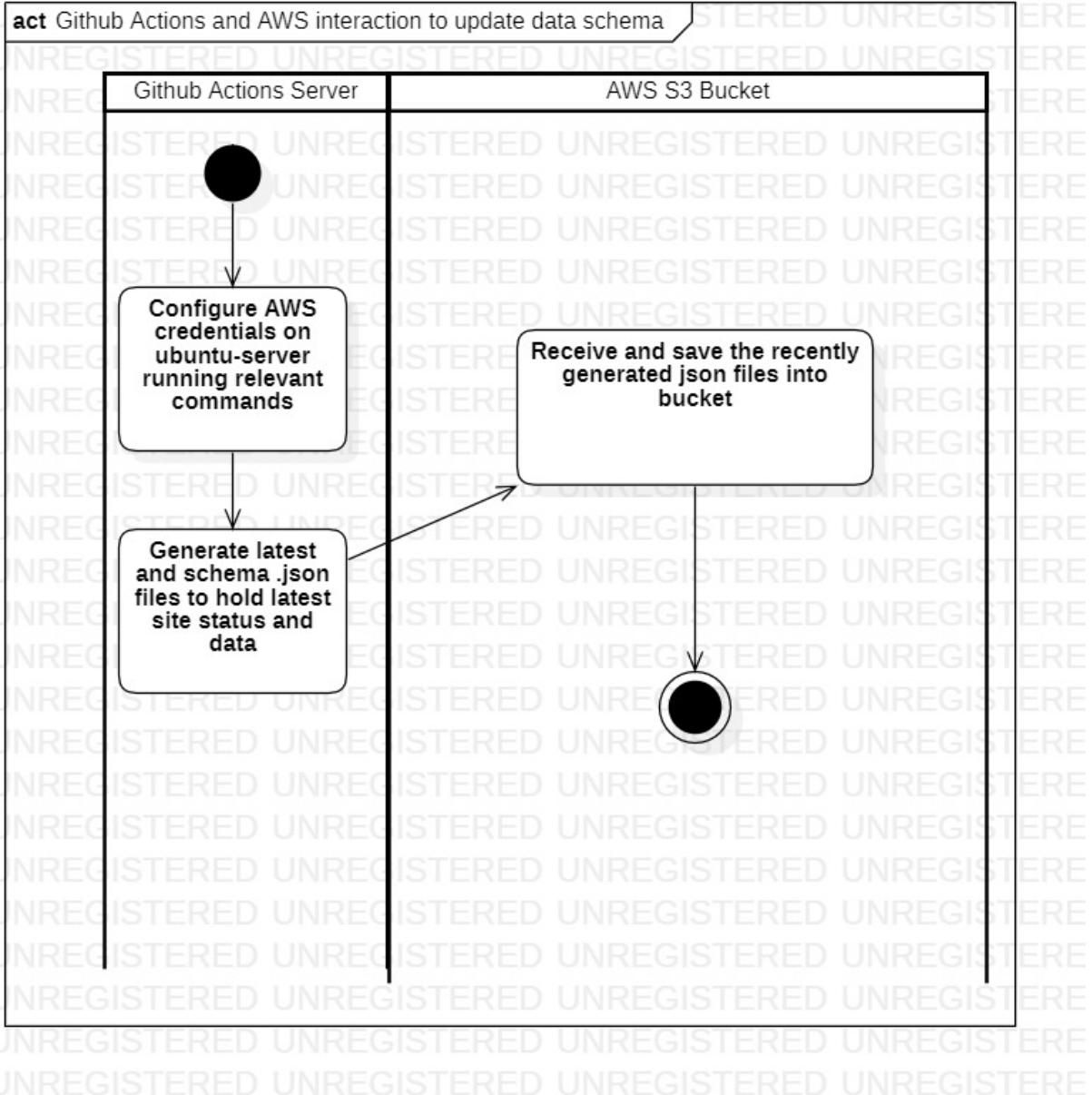


Figure 3: Activity Diagram — GitHub Actions and AWS Interaction to Update Data Schema

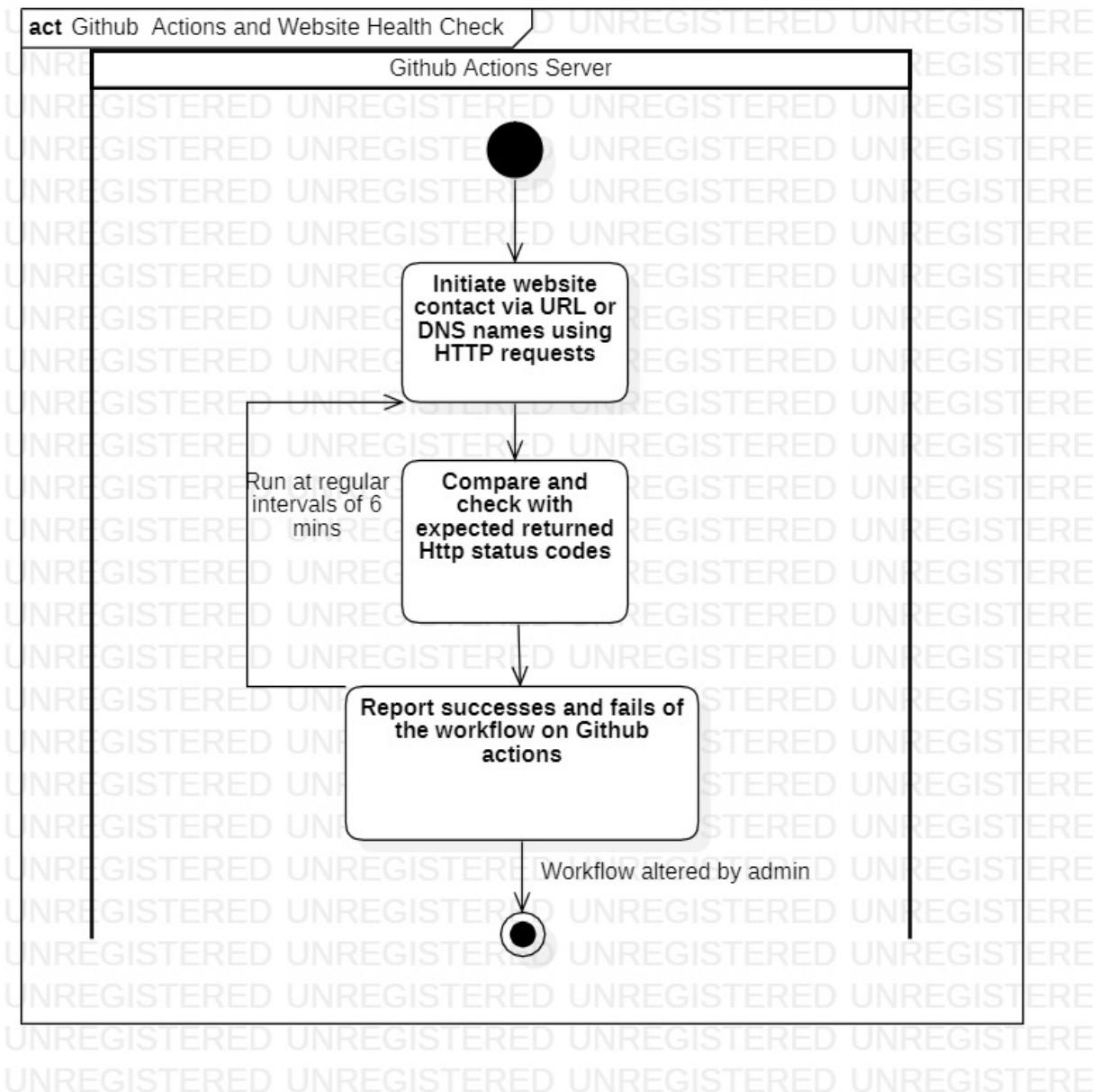


Figure 4: Activity Diagram — GitHub Actions and Website Health Check

4.2 Functional View

4.2.1 Stakeholders' Uses of This View

4.2.2 Component Diagram

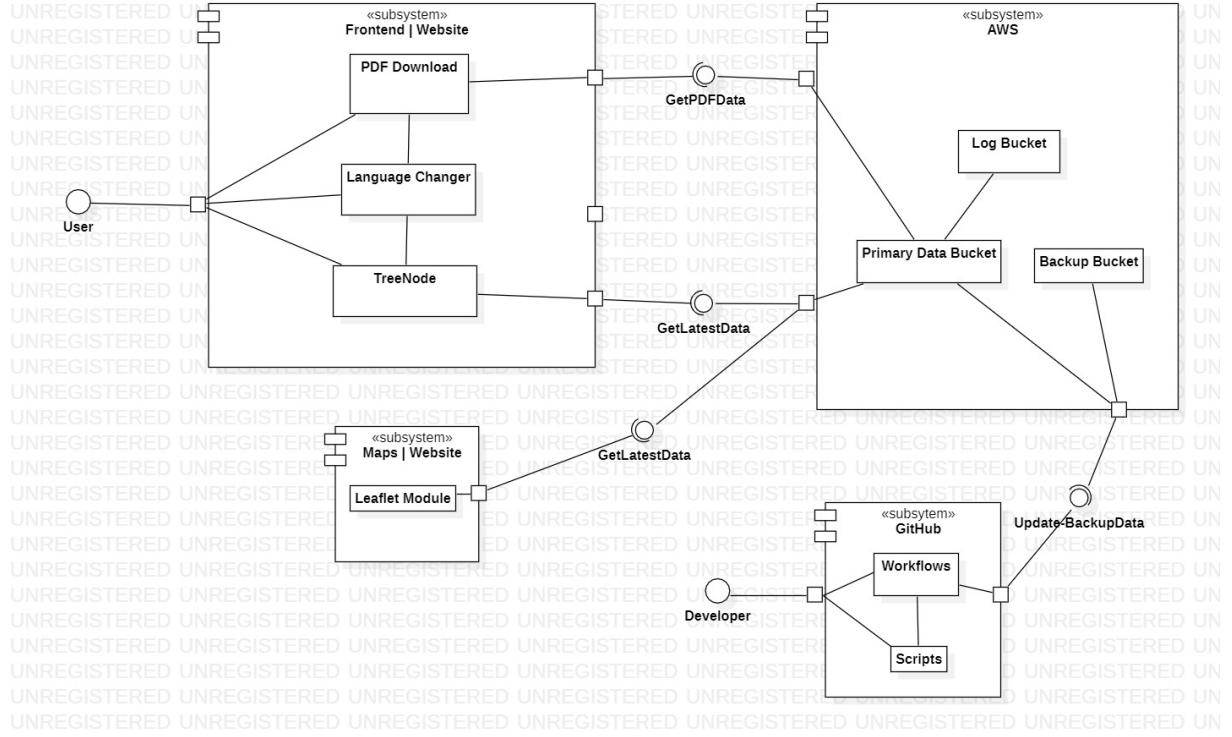


Figure 5: Component Diagram

Our system have four subsystems. Two of them subsystem is website subsystems.

- The website has two different subsystems which are the frontend, the main website, and the map, providing the map feature.
- The map subsystem use leaflet to show the data more effectively on the map.
- The frontend subsystem is divided into components to handle different request from the user.

It includes PDF component to get the PDF version of the website to use and distribute the website in offline mode. The PDF files are generated by workflows and stored in AWS.

This subsystem also has language changer to update the language setting of the website so that user can access the website in different language to use.

TreeNode is the main display component. It parse the data after getting the latest available data, `latest.json`, from the AWS.

- AWS is mainly used to `latest.json` (data), `schema.json` (schema of the `latest.json`) and PDFs.
- Github subsystem includes scripts and workflows. Scripts are generally written in python and used by the workflows. Workflows are responsible for checking, maintaining and updating the website in regular basis.

4.2.3 Internal Interfaces

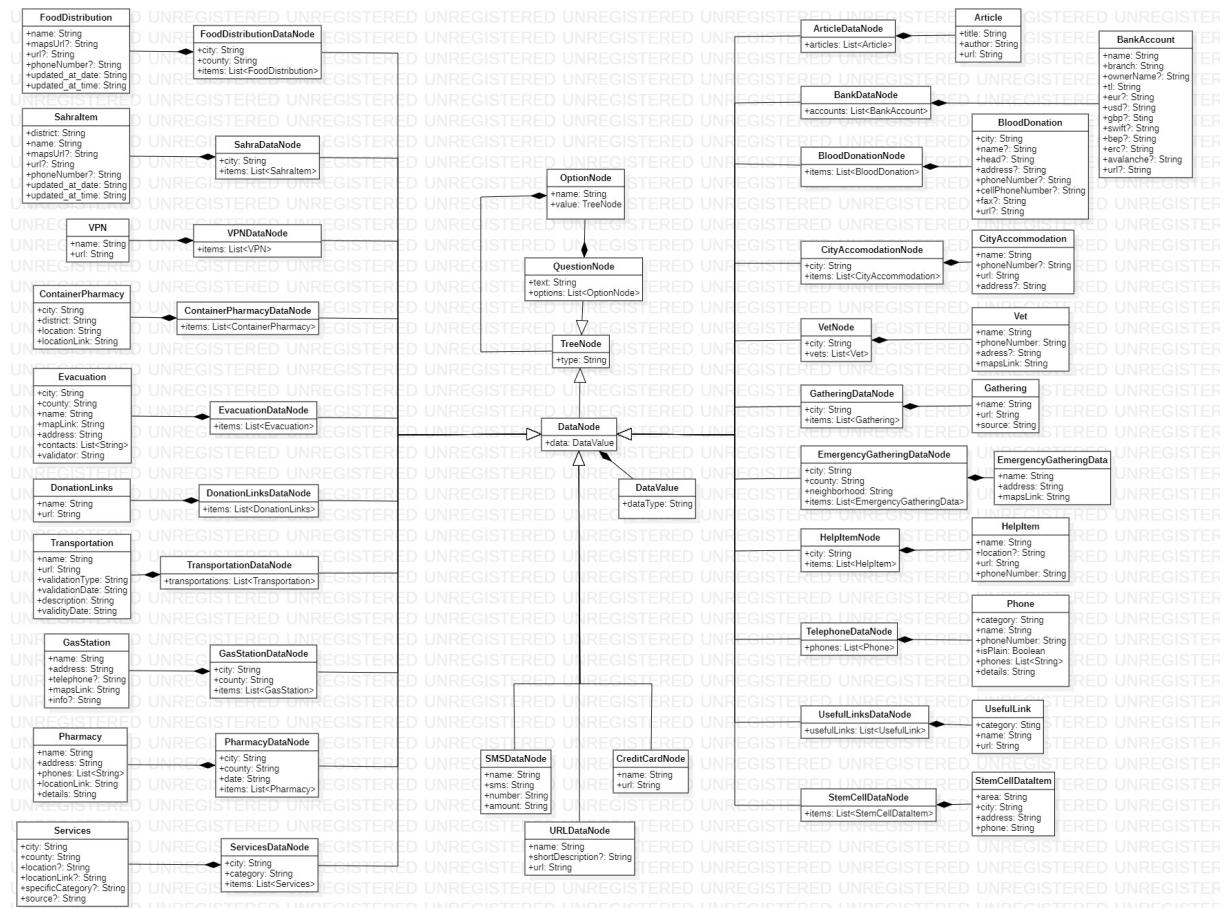


Figure 6: Internal Interfaces

There is no internal dynamism between interfaces. The internal interfaces are just the data interfaces to provide structured information for frontend code so that frontend code can parse the information correctly and fastly.

The main data is stored in the AWS in `latest.json` and retrieved from AWS so that the frontend code parses the data.

4.2.4 Interaction Patterns

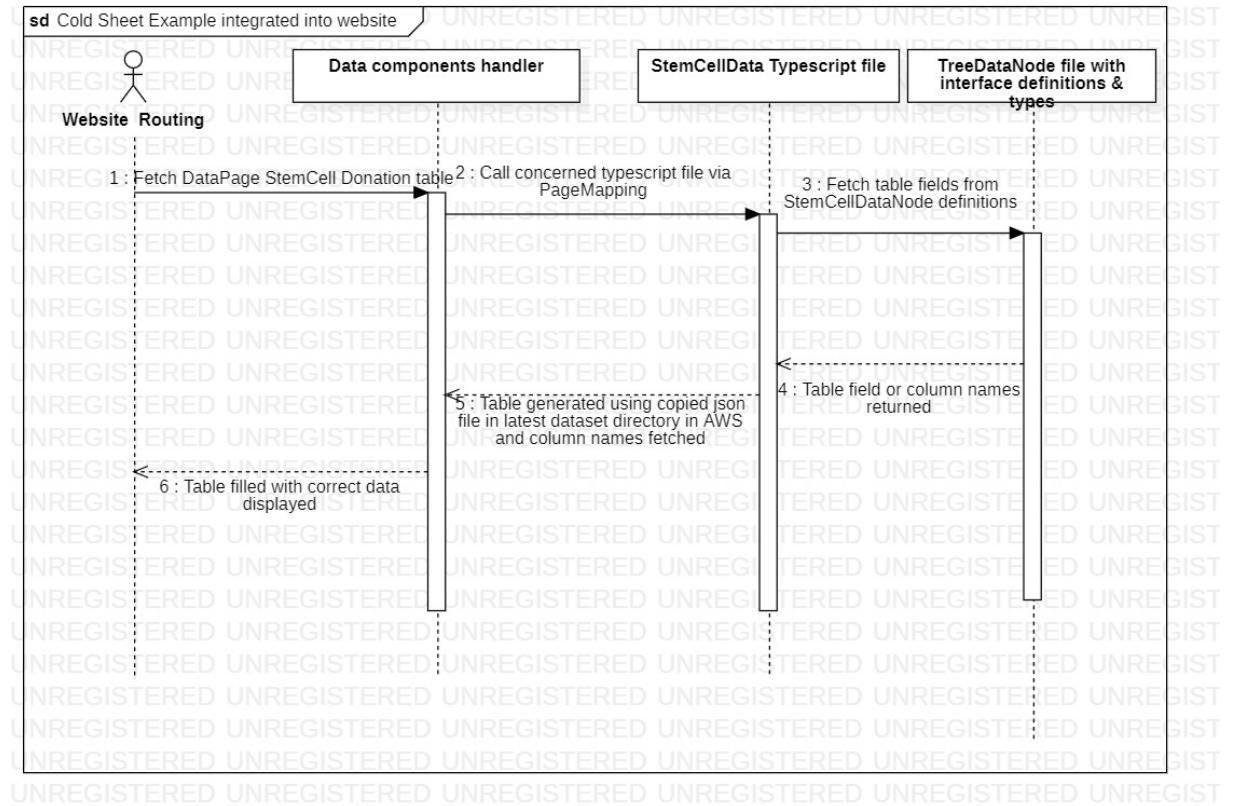


Figure 7: Sequence Diagram — Cold Sheet Example Integrated Into Website

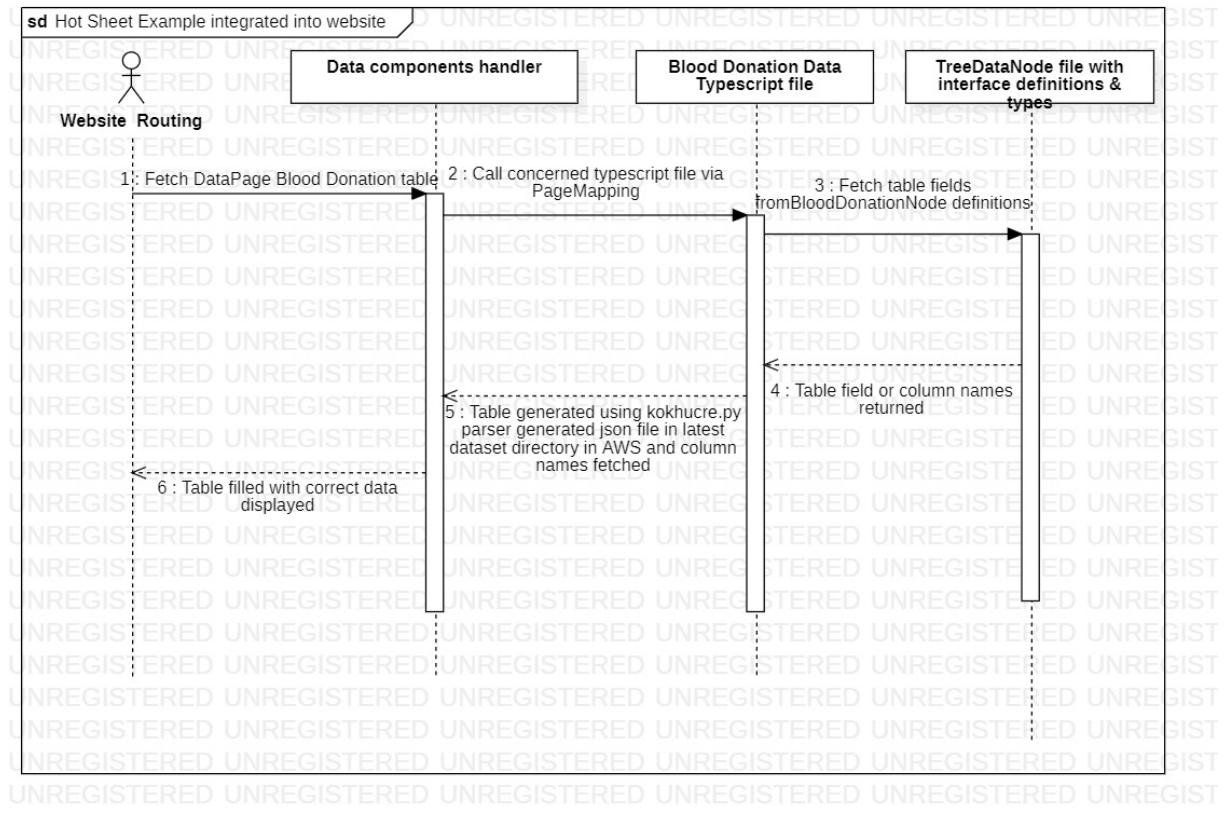


Figure 8: Sequence Diagram — Hot Sheet Example Integrated Into Website

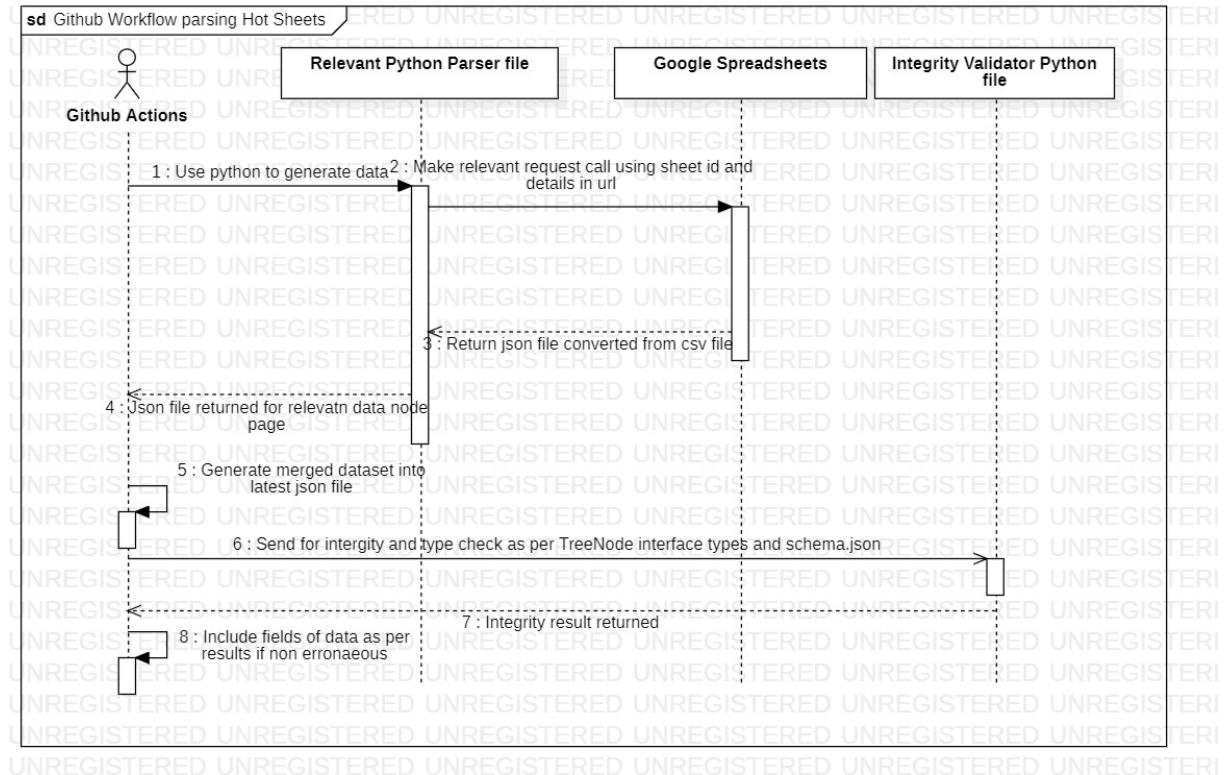
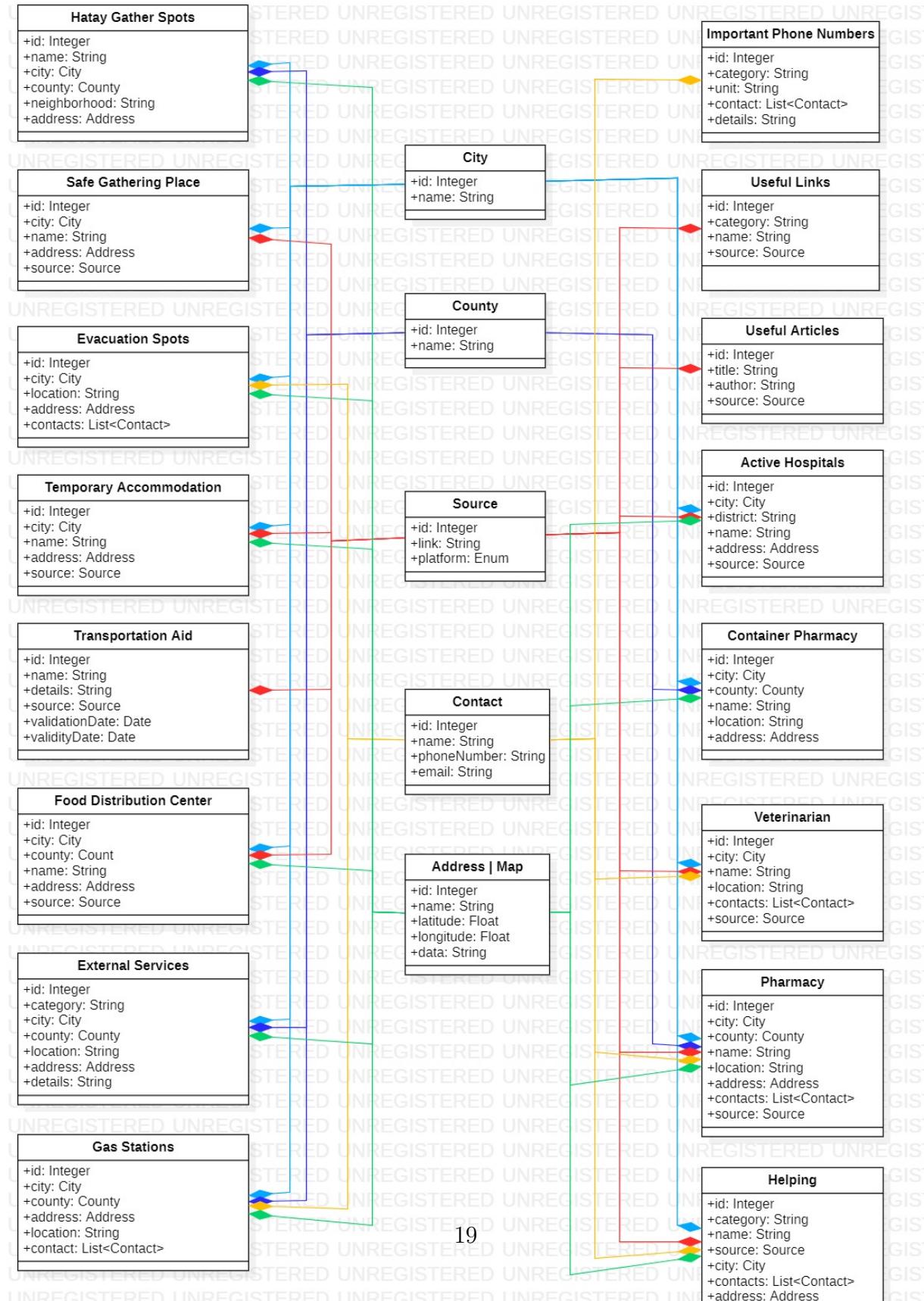


Figure 9: Sequence Diagram — GitHub Workflow Parsing Hot Sheets

4.3 Information View

4.3.1 Stakeholders' Uses of This View

4.3.2 Database Class Diagram

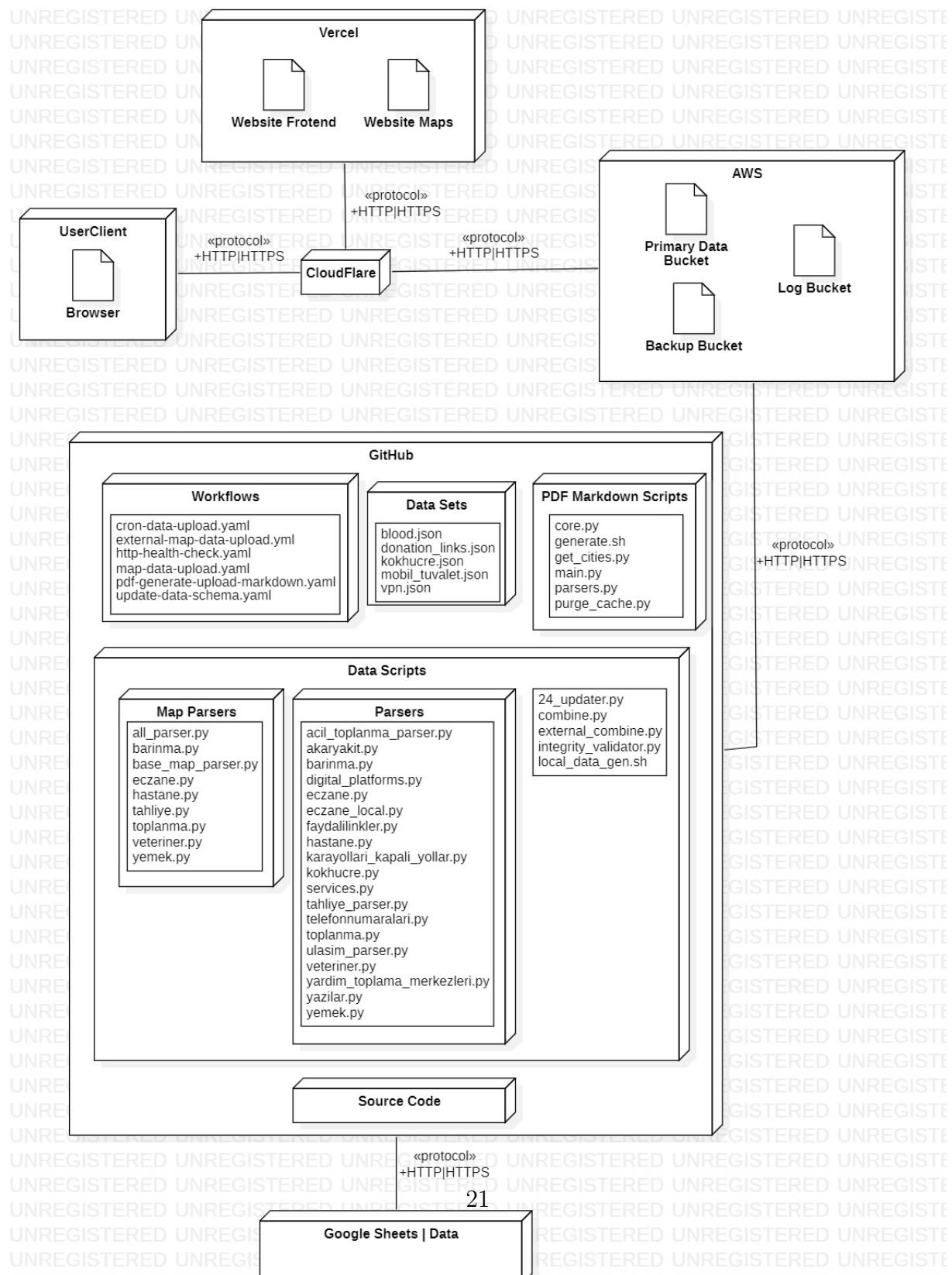


4.3.3 Operations on Data

4.4 Deployment View

4.4.1 Stakeholders' Uses of This View

4.4.2 Deployment Diagram



In our deployment diagram viewpoint, we show the deployment environment of the afetbilgi.com.

- User should use a javascript supported browser to access the website.
- Requests are met by CloudFlare and CloudFlare maps the related request. CloudFlare also gives supports for general protection such as using HTTPS, TLS and DDoS protection as well as the general protection.
- Vercel contains the website with both frontend and maps.
- AWS includes the primary data which is `latest.json` and other data. It also stores the backups and logs.
- GitHub provides source code and workflows. Workflow of GitHub checks, maintains and updates the data and the website. These workflows uses scripts to get the latest and stored data data and combine them to upload to AWS. Also, PDFs are generated and upload to AWS.
- Google Sheets store the data updated by data collectors and validators.

4.5 Design Rationale

5 Architectural Views for Suggestions to Improve the Existing System

5.1 Context View

5.1.1 Stakeholders' Uses of This View

5.1.2 Context Diagram

afetbilgi.com is not part of a more extensive system. It is a standalone and open-source efforted website to verify critical information in the fight against the 6 February 2023 Pazarcik Earthquake and deliver it to disaster victims and those who want to help in an understandable, concise manner in multiple languages.

This information is presented in either the form of legible tables with third-party governmental and private links or an interactable method via a map view interface. If deemed necessary, admin and maintainers can make changes to display newly created or edited data and upload it to the system upon any complaints or suggestions they may get on their contact details.

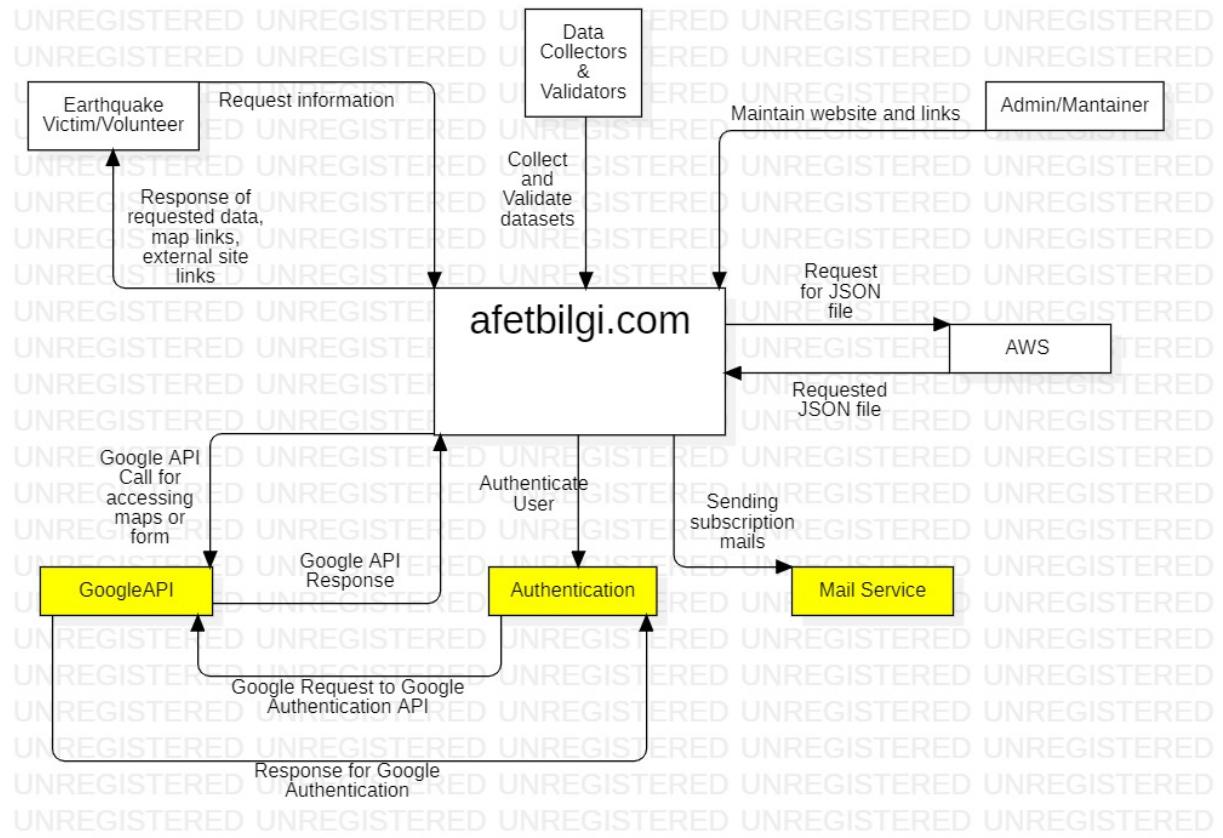


Figure 12: Suggested Context Diagram

The afetbilgi.com consists of a combination of small physical and software parts. With the help of interfaces, these parts communicate among themselves and with the user.

5.1.3 External Interfaces

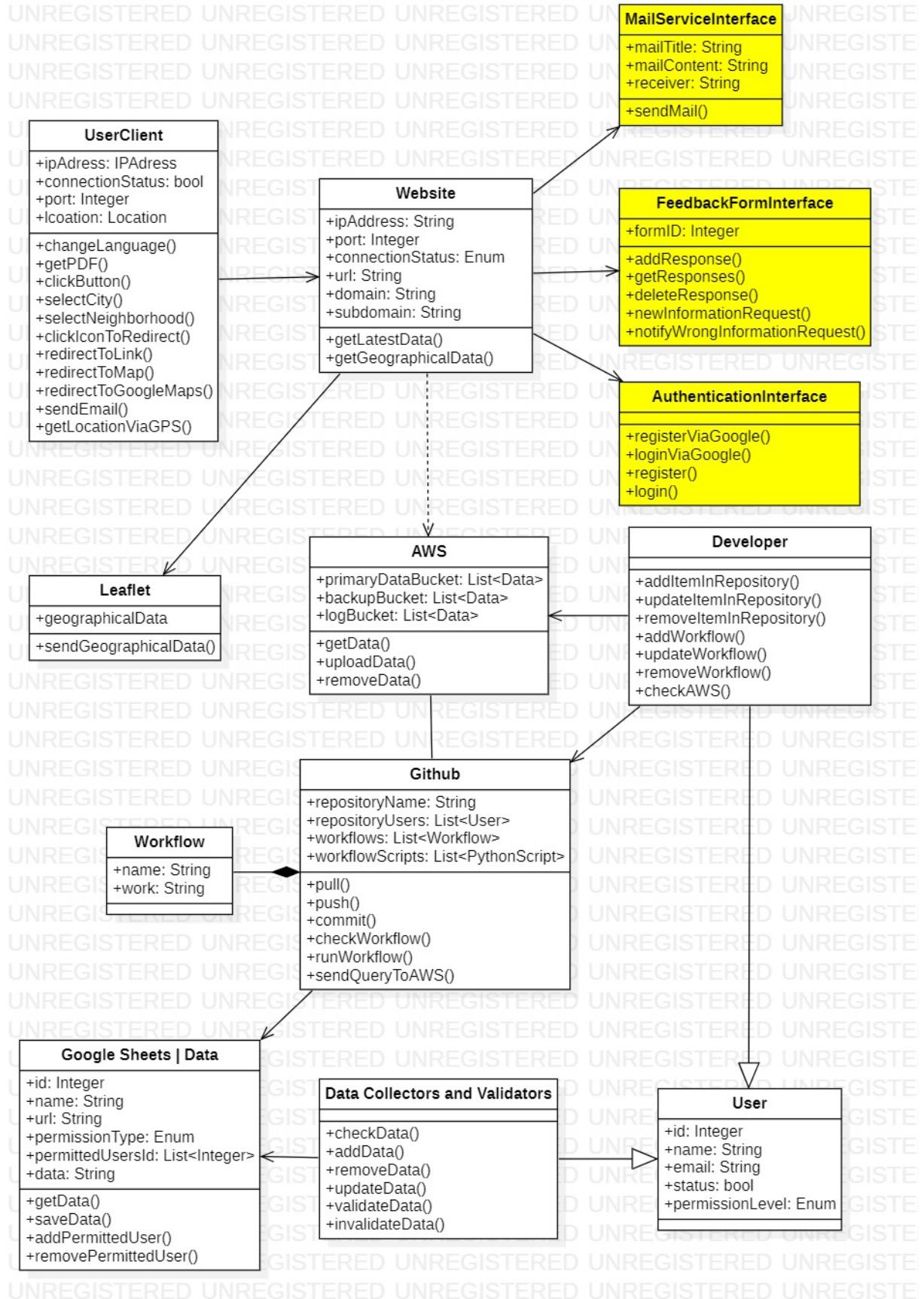


Figure 13: Suggested External Interfaces Diagram

As it can be observed from Figure 13, afetbilgi.com has multiple external interfaces. We have added MailServiceInterface, FeedbackFormInterface and AuthenticationInterface. The operations given in the diagram can be summarized as follows:

- MailServiceInterface provides the option of sending mail about the updated information to the subscribed users.
- FeedbackFormInterface provides the option of sending feedback related to website and the data. Users from the earthquake region can request for adding new information and notifying the wrong and expired information.
- AuthenticationInterface provides the option of logging in. The authentication system is used to provide opportunity to authorized institutions and organizations to update the information from the website directly.

5.1.4 Interaction Scenarios

5.2 Functional View

5.2.1 Stakeholders' Uses of This View

5.2.2 Component Diagram

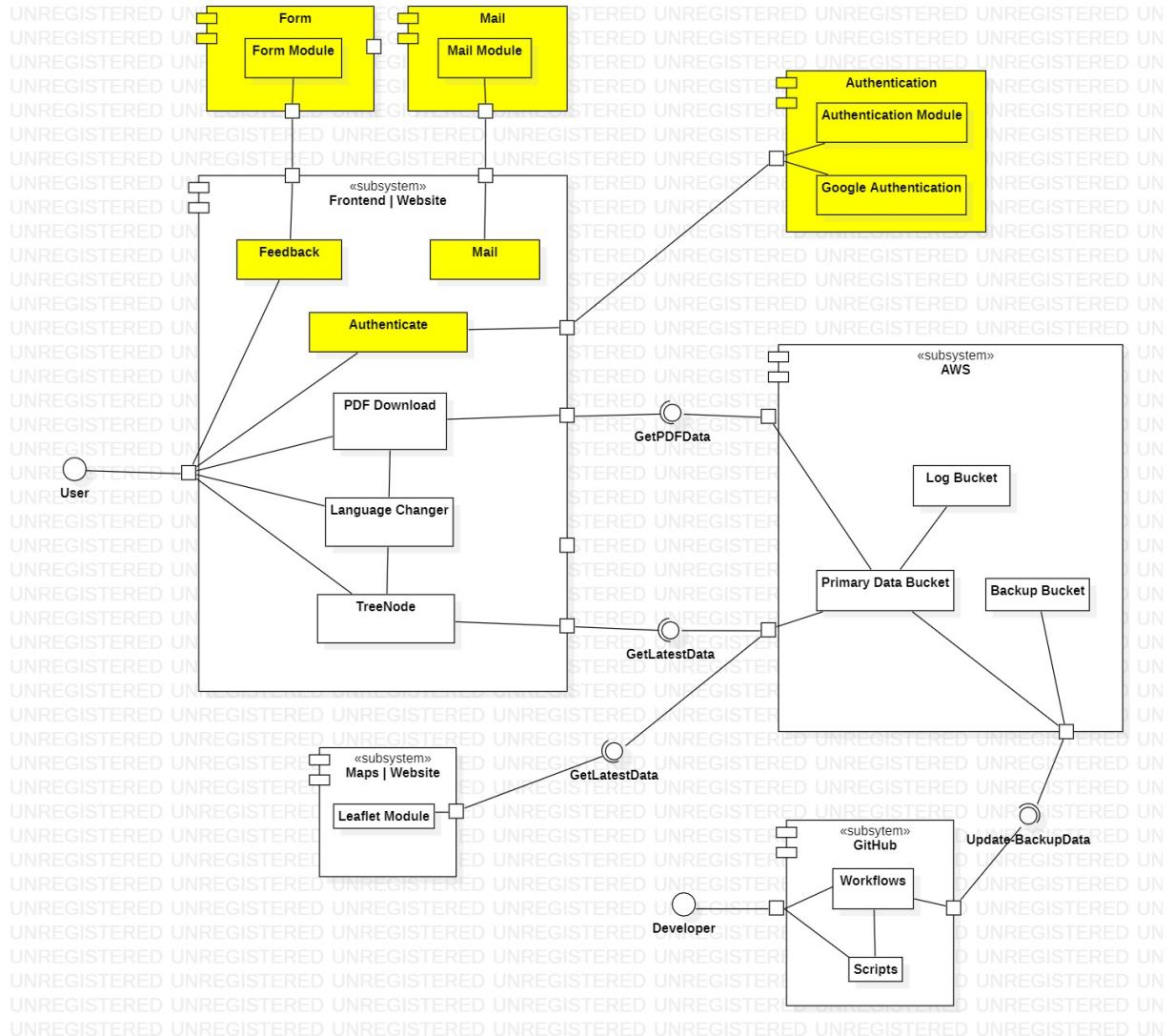


Figure 14: Suggested Component Diagram

We have updated component diagram by adding the components for form, mail and authentication components:

- Form provides user to send feedback about website and data so that the website and data can be updated according to the feedback by the normal users and victims.

- Mail component sends mail about the updated information to the subscribed users.
- Authentication component provide authorized users to register and login to the website by using Google Authentication system or built-in Authentication Module.

5.2.3 Internal Interfaces

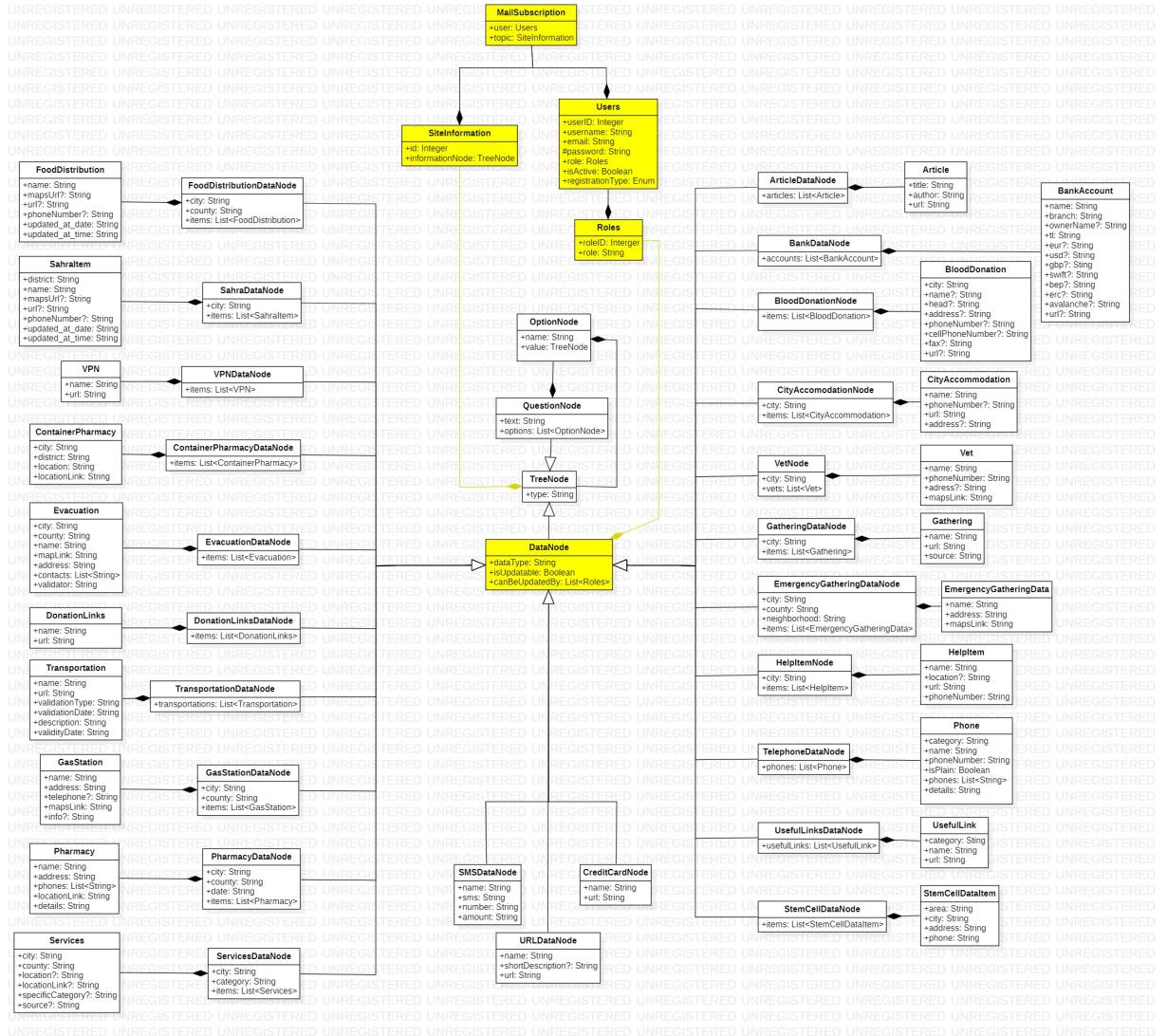


Figure 15: Suggested Internal Interfaces

Since, there is no internal dynamism between interfaces initially, we embraced the same approaches. Therefore, the internal interfaces are just the data interfaces to provide structured information for frontend code so that frontend code can parse the information correctly and fastly.

The main data is stored in the database and retrieved from database, so the frontend code parses the data.

5.2.4 Interaction Patterns

5.3 Information View

5.3.1 Stakeholders' Uses of This View

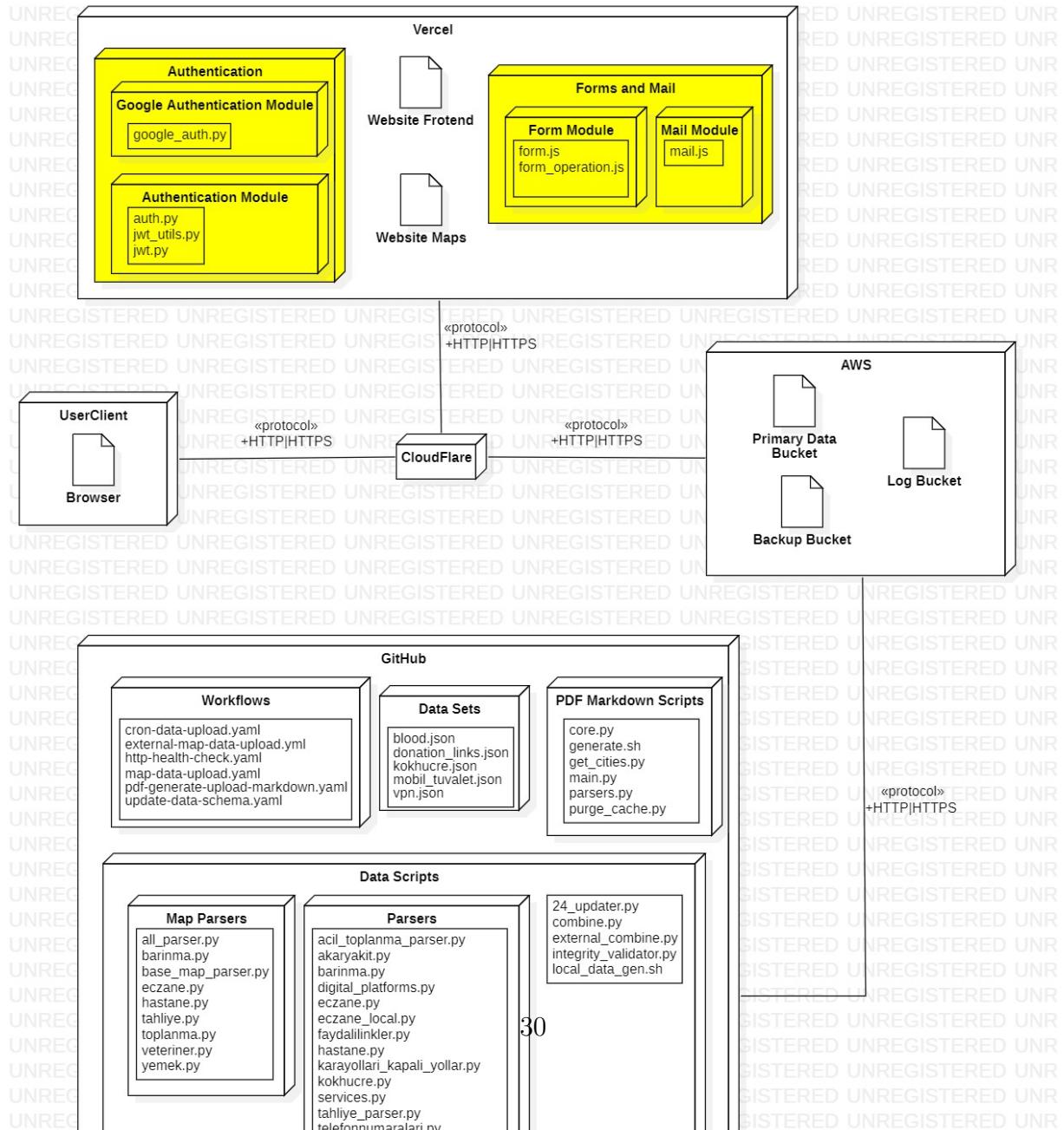
5.3.2 Database Class Diagram

5.3.3 Operations on Data

5.4 Deployment View

5.4.1 Stakeholders' Uses of This View

5.4.2 Deployment Diagram



- Authentication provides authorized users to register and login. It uses two systems which are Google Authentication and built-in Authentication System.

Google Authentication access the Google API for authentication. Built-in authentication system use stored database information with JSON Web Tokens (JWT) for token based authentication system.

- Form provides user to send feedback about website and data. Forms to provide feedbacks are defined according to needs. Some operations such as uploading image as well as the basic form operations such as submitting.
- Mail module sends mails if there is an update in the website.

5.5 Design Rationale