

## Plans for Sprint 2 and 3

Team member name	Roles/responsibilities
Stanley (23345768)	Frontend Development & Documentation
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### Introduction:

Within the University of Western Australia Motorsport club (UWAM), a vibrant and ever-evolving environment, students actively participate in the processes of conceptualising, constructing, and competing with formula-style race cars. However, a crucial obstacle has emerged, namely the requirement for effective knowledge dissemination among team members. In order to tackle this issue, our project is centred around the creation of a Failure, Reporting, Analysis, and Corrective Action System (FRACAS) for UWAM. The aforementioned system is poised to assume a critical function within a comprehensive framework for knowledge management and transfer. It facilitates the retrieval of records pertaining to previous failures and their respective remedies, thereby enabling both present and future members of the team to access this valuable information.

In the pursuit of improving UWAM's operations and performance, we have undertaken a technical initiative that encompasses the development of both front-end and back-end systems. In the development phase, we are designing a web interface that prioritises user-friendliness by utilising advanced technologies like React.js, HTML, and CSS. The interface will function as the primary access point to our Failure Reporting, Analysis, and Corrective Action System (FRACAS), facilitating smooth navigation and user engagement.

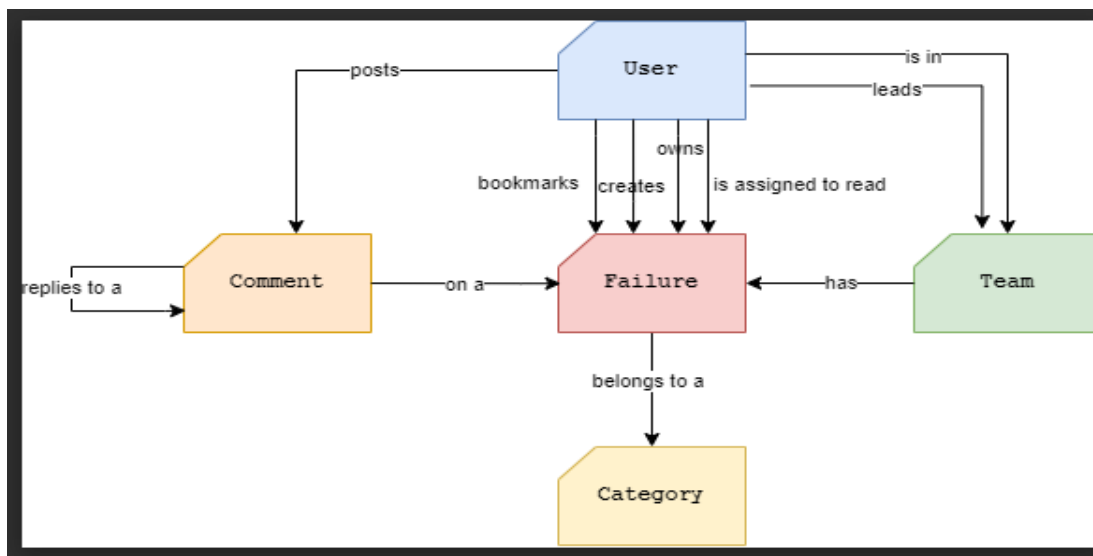
The foundation of our system is located in the backend, where we have chosen to utilise the resilient and adaptable PostgreSQL database. The database structure has been carefully crafted to effectively accommodate the complex intricacies of the UWAM ecosystem. Tables such as the "user" table serve as repositories for crucial data pertaining to team members, thereby fostering efficient collaboration and active participation. The "failure record" documents essential elements of each instance of failure, encompassing dates, plans for corrective action, and additional pertinent details. The implementation of a specialised "category" table facilitates the efficient categorisation of failures, thereby improving the overall organisation and search functionality. Finally, the "team" table effectively encapsulates the fundamental characteristics of each team, thereby facilitating a seamless connection between team members and their individual contributions.

With the integration of advanced front-end development and a robust back-end database, there is potential for a significant transformation in the way UWAM approaches knowledge management. This integration can facilitate streamlined scheduling, enhanced budgeting, efficient management, precise vehicle testing, and informed design efforts. The present endeavour symbolises the collective effort of UWAM, Professor Melinda Hodkiewicz, Erwin Bauernschmitt, and the project team, who are all united in their aspiration for a more streamlined and prosperous future for UWA Motorsport.

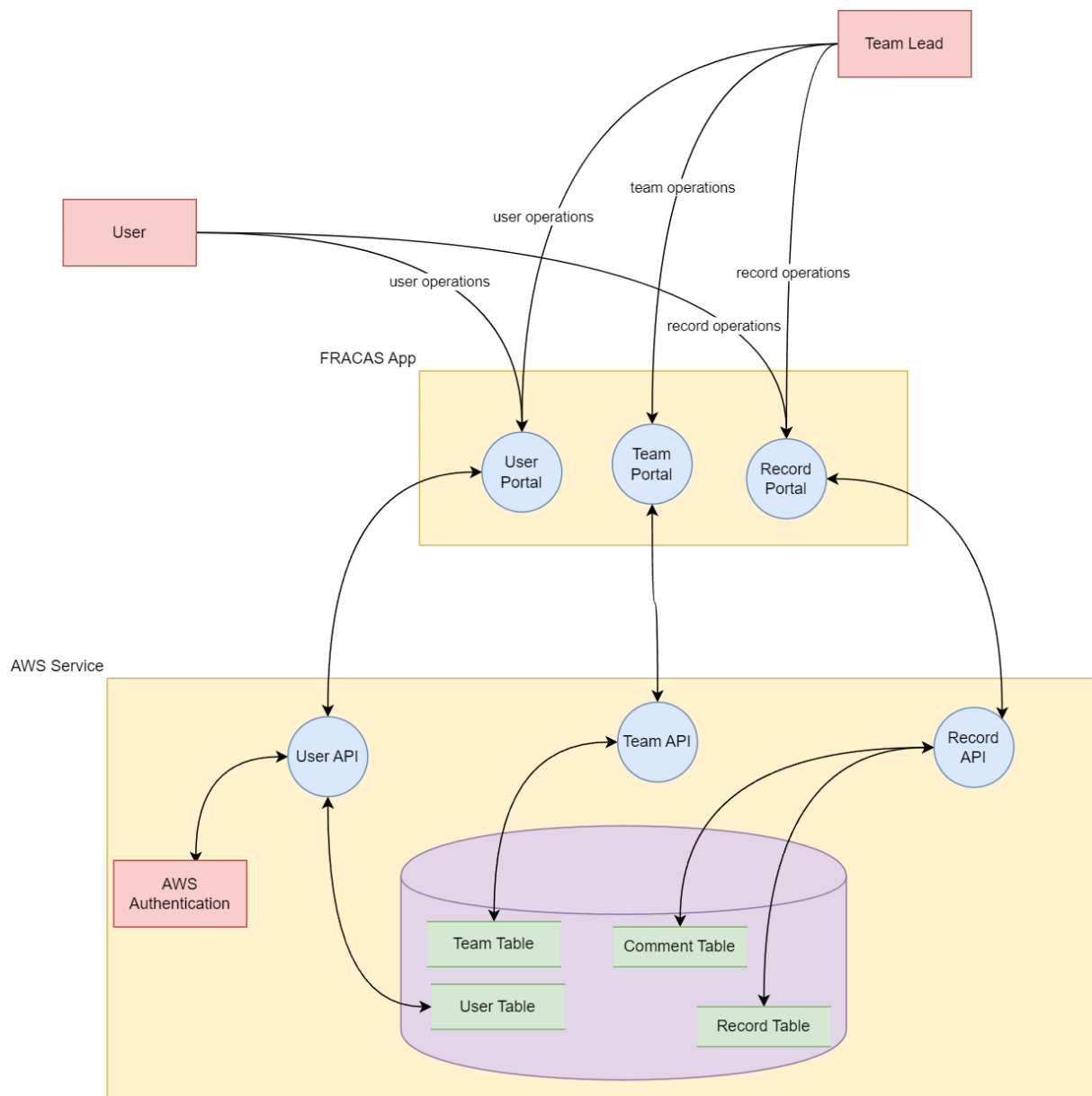
This document aims to provide a comprehensive overview of our technical contribution, which aligns with the Agile principles that prioritise concise and impactful innovation. Please join us as we explore the core of our contribution, highlighting the interdependent synergy between React.js, PostgreSQL, AWS and the commitment of the UWAM team.

### Visual representations:

#### The database conceptual E-R diagram:



## The overall project solution framework:



## Technical Architecture Overview:

The FRACAS system has been specifically developed to cater to two distinct user roles, namely team leads and team members. The comprehensive solution is contained within a singular web application known as the FRACAS App. This application comprises three distinct portals, namely the User Portal, the Team Portal, and the Record Portal. Every portal is customised to cater to the unique requirements of the user's role.

### User Portal:

The user portal is a digital platform that allows users to access and interact with various services and resources.

This platform is designed for team members, providing them with the ability to carry out operations that are specific to their user account. These operations include managing their personal profile, accessing records of previous failures, and utilising features such as commenting and bookmarking.

### **Team Portal:**

The Team Portal grants team leads with privileged access to a range of sophisticated functionalities, encompassing team administration, user administration, and record administration. This portal serves as the central platform for managing and supervising team-oriented activities.

The Record Portal is a digital platform designed for the purpose of storing and organising data and information.

The Record Portal serves as a platform for team leads to engage in interactions and oversee the management of failure records. This feature enables individuals to authenticate, evaluate, and allocate responsibility for instances of failure, thereby facilitating the ongoing enhancement of UWAM's projects.

The technologies and tools utilised in this study are as follows:

### **Front-end Development:**

Front-end development refers to the practise of creating and implementing the user interface and user experience of a website or application. It involves the

The foundational building blocks of our web interface consist of HTML5, CSS3, and JavaScript. These technologies facilitate the development of user interfaces that are both dynamic and responsive.

React.js, a JavaScript library that is widely acknowledged and renowned for its user-friendly nature, significantly enhances the process of front-end development through its ability to facilitate the creation of efficient component-based architecture.

### **Back-end Development:**

The field of back-end development refers to the process of creating and maintaining the server-side components of a software application.

The back-end of our project is implemented using the Python programming language, which is highly suitable for the specific requirements and technical proficiency of our team.

The selection of Django as a web framework is motivated by its robustness and adaptability, which are attributed to its integrated database functionalities and user-friendly nature. This choice is advantageous as it allows for efficient time management by reducing the need for extensive SQL coding.

### **Database Management:**

PostgreSQL has been selected as the preferred relational database management system due to its robust capabilities in handling complex queries and its potential for future scalability.

The Amazon RDS (Relational Database Service) platform provides support for PostgreSQL and is designed to be compatible with our deployment strategy on Amazon Web Services (AWS).

### **Cloud Hosting:**

Cloud hosting refers to the practise of hosting websites, applications, and other digital resources on virtual servers that are accessed through the internet.

Our hosting platform is provided by Amazon Web Services (AWS). The backend infrastructure of AWS Elastic Cloud Compute (EC2) is responsible for hosting, while the database is managed by Amazon RDS.

The Amazon Virtual Private Cloud (VPC) is designed to establish and maintain secure connectivity and networking capabilities within the Amazon Web Services (AWS) environment.

The process of integrating an Application Programming Interface (API) into a software system.

**API Integration:**

The User API, Team API, and Record API serve to facilitate the seamless exchange of data and interactions between the user interfaces and the underlying database system.

The application programming interfaces (APIs) facilitate regulated access and smooth data interchange between the frontend and backend elements.

In conclusion, it can be inferred the technical architecture of our system integrates user interfaces, back-end processing, and database management, resulting in improved communication efficiency and enhanced knowledge management and transfer capabilities within the UWAM framework. By integrating these technologies and tools, a dependable, adaptable, and user-centric FRACAS system is implemented, which is in line with the objectives of our project and provides concrete advantages to the University of Western Australia Motorsport club.

This documentation offers a comprehensive examination of the technical underpinnings of our project, emphasising the harmonious integration of diverse tools and technologies utilised to develop a holistic solution.