Taskmaster Project Proposal

ClickDown

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Contents

1 Background

1.1 Problem Scope

From the initial client proposal, the following objectives were the problems that must be addressed by the software solution:

- **CORE-1** Users are to have a profile with name and contact email address
- **CORE-2** Users have the ability to request connections with other users to form teams
- **CORE-3** Users are able to accept or decline connection requests from other users
- **CORE-4** Users may create tasks and specify their titles, descriptions, and deadlines
- **CORE-5** Users are able to assign tasks to connected users. These tasks must have a task-ID, and will be automatically assigned to the task creator
- **CORE-6** Connected users must be able to view each other's profiles.
- **CORE-7** Connected users must be able to view each other's assigned tasks
- **CORE-8** The assigned task list must show a task's ID, title, and deadline (sorted by deadline - earliest to latest)
- **CORE-9** Users are able to update their task's state between "Not Started", "In Progress", "Blocked", and "Completed"
- **CORE-10** Users are able to search their tasks by any combination of task-id, title, description and deadline
- **CORE-11** Connected users can view each other's estimated workload (0-100%) over the next week. Estimations can be based on assigned tasks, task states, deadlines and similar task completion times.

1.2 Analysis of Problem Domain

From the core functionality stated in the project scope, the main workflows are:

- Creating a new task and adding relevant information
- Looking at connected user's profiles to check their current workload and where they may be contacted
- Assigning tasks to user/s, and potentially tracking the progress of the tasks

Different implementations of a task managing application will be investigated in order to determine how well they cater to the above workflows and whether any improvements can be made to make it easier and more intuitive to use. The analysis will provide a rationale for some of the design decisions and potential extension user stories.

1.3 Mondays.com Case Study

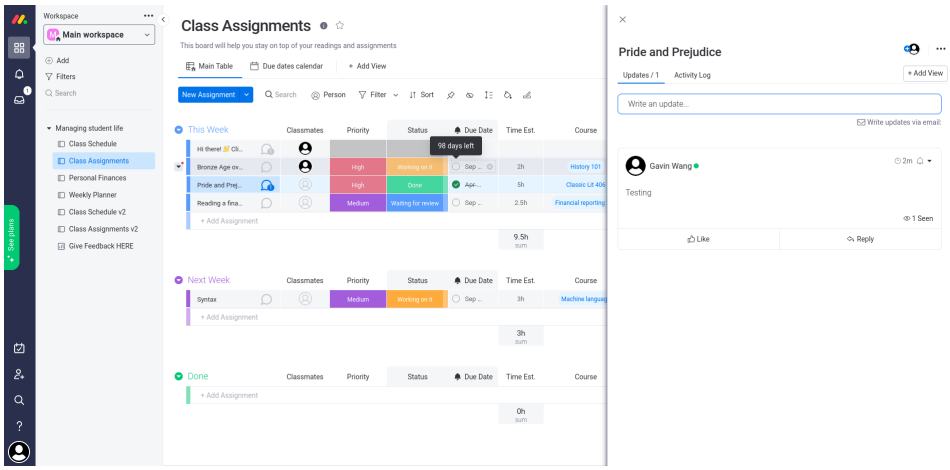


Figure 1: Screenshot of Mondays.com (Monday, 2021)

Monday.com (Monday, 2021) creates highly customisable tasks using excel-like structures that can be organised into categories. The site has the functionality to see an overview of the tasks within a calendar and clicking on the task will display task specific information.

Blair-Early & Zender (2008, p. 100) outline the importance for users to be able to identify the logical relationship between actions and effects. The site's extensive functionality comes at the expense of usability since the UI becomes cluttered with buttons which, while helpful for advanced users, may be intimidating for beginners. Functionality such as the calendar view and task view (divided into "in progress", "future" and "past") being located in two different locations is logically inconsistent. Likewise, there are two different search bars - searching within the current workspace and another for an universal search.

1.4 ClickUp.com Case Study

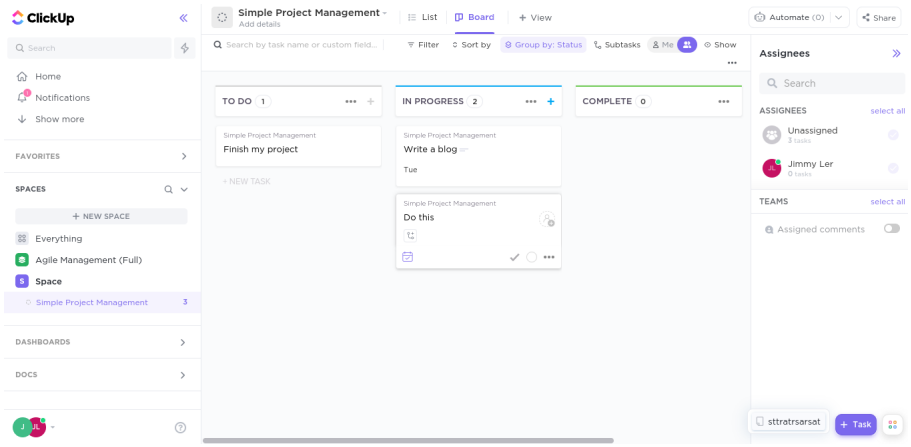


Figure 2: Screenshot of ClickUp.com (Clickup, 2021)

ClickUp.com (ClickUp, 2021) by default displays tasks as a list of cards which may be arranged in categories. The user has the ability to add different "views" that change the way the tasks are presented to calendars, task boards, mind maps etc. Despite the efforts to hide the complexity of using the program, multiple reviewers shared the sentiment with McKinney (2021) in that "users were overwhelmed by features in the software", and that "while documentation is good, features can be easily missed". Evidently, there is a compromise between usability and functionality which impacts the software's ability to address its primary purpose of managing tasks.

ClickUp's support for collaboration is limited to just assigning the tasks to users and giving editing privileges of the task. In comparison with the proposed project, users' collaboration is regarded more highly (CORE-11) and the program needs to provide information for taskmasters to find the best user to assign a task to. According to Salas (2005, p. 579) "reducing work overload is an important component of team effectiveness", hence the ability to redistribute the workload and have adaptable assignments are important. This would mean that the project should integrate more heavily with collaborative features such as suggested assignment of tasks based on workload, and notifications to reassign tasks.

1.5 Development Rationale

Mondays.com, ClickUp and similar services are comprehensive in their scope. However, of the few critiques (Trustradius Reviews, 2021) that exist of these platforms, notable issues were: a steep learning curve, intimidating interface,

lack of accessibility options, scalability at a fine granularity and lack of greater task/subtask movement and control. Additionally the ability to roll back changes or review previous versions of uploaded documents was a largely absent feature.

Ultimately, many task management applications run the risk of being another to do item themselves; nothing more than paperwork required by management to track progress, as opposed to a valuable tool improving the workflow of a team. To mitigate this as much as possible, the application should be effortless to use as well as provide crucial data at a glance. Designing the system with accessibility foremost in mind will allow us to create a more intuitive interface than big name competitors, while accessing a neglected subset of users. ClickUp added voice assisted interface interaction to its product 3 years ago and allegedly was the first to do so among task management applications (How To Connect With Alexa & Google Assistant, 2018). Given how long competitors have existed in this space, accessible design is evidently a tertiary concern for the majority.

Clearly there exists room in the market for an intermediate service that offers more than the overly simplistic Trello board, has more native add-ons than Jira (checklists are a plugin?) while avoiding the pitfall of feature saturation that makes ClickUp and Mondays difficult to adopt into a company's ecosystem. The core issues outlined above justify the need for the primary innovations that our system will bring to market - addressed in the Novel Functionality section below.

2 User Stories and Sprints

2.1 Product Backlog

2.2 Sprint Details

For screenshots, see appendix - figure 1, figure 2, figure 3

2.2.1 Sprint 1 (20 Jun - 29 Jun)

- CWC-37 As a user, I want to register my personal details so that others can identify me.
- CWC-36 As a user, I want to use my email address to register my account so that I can find my password if I forget.
- CWC-38 As a user, I want to securely log in to the application so that others cannot impersonate me or see privileged data without permission.
- CWC-39 As a user, I want to have a list of tasks on my profile so that I can communicate the status of my work.

- CWC-67 As a user, I want to log out of my account so that my account is not compromised when I am not using it.
- CWC-68 As a user, I want to modify my personal details so that I have some flexibility in setting my personal details with the app.
- CWC-51 As a user, I want to create tasks so that I can track their process.
- CWC-40 As a user, I want to give tasks attributes so that they can be easily identified.

2.2.2 Sprint 2 (30 Jun - 20 Jul)

- CWC-41 As a user, I want to assign tasks to either myself, or other users I am connected to so that I can delegate tasks.
- CWC-42 As a user, I want to update my tasks so that I can communicate the state of them.
- CWC-43 As a user, I want to search for tasks so that I can see the details of a specific task.
- CWC-44 As a user, I want to label tasks so that I can more easily organise them by type.
- CWC-45 As a user, I want to be able to input estimations of task length and difficulty to more accurately calculate my time commitments.
- CWC-46 As a user, I want to view the profiles of other users so that I can choose who I want to work with.
- CWC-50 As a user, I want to request connections with 1 or more users so that I can collaborate with team mates.

2.2.3 Sprint 3 (21 Jul - 1 Aug)

- CWC-47 As a user, I want to be able to accept or decline connection requests.
- CWC-48 As a user, I want to have separate groups for each team I am a part of so that I can better organise tasks and responsibilities.
- CWC-49 As a user, I want to know how busy my teammates are so that I can decide how to divide tasks among other team members.
- CWC-60 As a user, I want to talk to a chatbot for simple requests so that I can avoid interacting with an interface.
- CWC-61 As a user, I want the system to learn how fast I complete certain tasks and adjust time estimates so that I can more accurately gauge my commitments.

- CWC-63 As a user I want to attach files to tasks so that my team can track progress and collaborate easier.
- CWC-69 As a user, I want to see the history of changes made, so that I can go to a previous version if need be.

2.2.4 Potential Features Backlog

For screenshot of backlog, see appendix - figure 4

- CWC-52 As a user I want to be able to synchronise tasks with my calendar so that I can see my itinerary in one place.
- CWC-53 As a user I want to create custom task statuses with descriptions so that I can more clearly define issues and progress.
- CWC-54 As a user I want my tasks to have progress bars so that I can show my team how close they are to being done.
- CWC-55 As a user I want to potentially have multiple task owners so that I can show joint responsibility for a task.
- CWC-56 As a user I want to have recurring tasks so that I don't have to input weekly deliverables every cycle.
- CWC-57 As a user I want the system to email me reminders so that I don't forget deadlines.
- CWC-58 As a user I want to import from other organisational toolings so that I can see all my tasks in one place.
- CWC-59 As a manager I want to see a leaderboard showing tasks completed for each user so that I can reward high performing employees.
- CWC-62 As a user I want to communicate directly with other team members so that key information is kept on the site.
- CWC-64 As a user I want to use my Facebook or Google account to login so that I do not need a new account.
- CWC-65 As a user I want to have a home page so that I can know the basic information about the app.

3 Project Objectives and User Stories Mapping

Project Objectives	Relevant User Stories
CORE-1 Users are to have a profile with name and contact email address	CWC-37
CORE-2 Users have the ability to request connections with other users to form tea	CWC-50
CORE-3 Users are able to accept or decline connection requests from other users	CWC-47
CORE-4 Users may create tasks and specify their titles, descriptions, and deadlines	CWC-51, CWC-40
CORE-5 Users are able to assign tasks to connected users. These tasks must have a task-ID, and will be automatically assigned to the task creator	CWC-41
CORE-6 Connected users must be able to view each other's profiles.	CWC-37
CORE-7 Connected users must be able to view each other's assigned tasks	CWC-39, CWC-42
CORE-8 The assigned task list must show a task's ID, title, and deadline (sorted by deadline - earliest to latest)	CWC-40
CORE-9 Users are able to update their task's state between "Not Started", "In Progress", "Blocked", and "Completed"	CWC-40, CWC-42
CORE-10 Users are able to search their tasks by any combination of task-id, title, description and deadline	CWC-43, CWC-44
CORE-11 Connected users can view each other's estimated workload (0-100%) over the next week. Estimations can be based on assigned tasks, task states, deadlines and similar task completion times	CWC-45, CWC-49

3.1 Extended Novel Functionality

Project Objective	Relevant User Stories
EXTENSION-1 Users have a conversational interface option natively integrated into the platform.	CWC-60
EXTENSION-2 The system adjusts time estimates for similar tasks based on statistical models of historical performance.	CWC-61
EXTENSION-3 Users can upload and attach files to a task that persists as the task moves through the system pipeline.	CWC-63
EXTENSION-4 Group project boards maintain a version history so that accidental or malicious changes can be easily reversed.	CWC-69

We believe that these four extensions would concretely implement the potential improvements identified in the Development Rationale above. With a focus on ease of use and simplicity, our system would be lightweight while also addressing the core concerns identified by disenfranchised users of competing software. In this way, we hope to create a platform that is accessibility focussed and not an additional job to maintain, a true task management assistant.

4 Technical Diagrams and Models

4.1 External Actors and Their Interactions

Guest – users who are not logged in:

- View a landing page outlining the basic functionality of the system
- Create an account by registering their personal details
- Login to their account should they have one

Registered user (Base):

- Create tasks
- Assign tasks to connected users
- Request connection with other users
- Accept or decline connection requests from other users
- Logout of their account

User connected with another user:

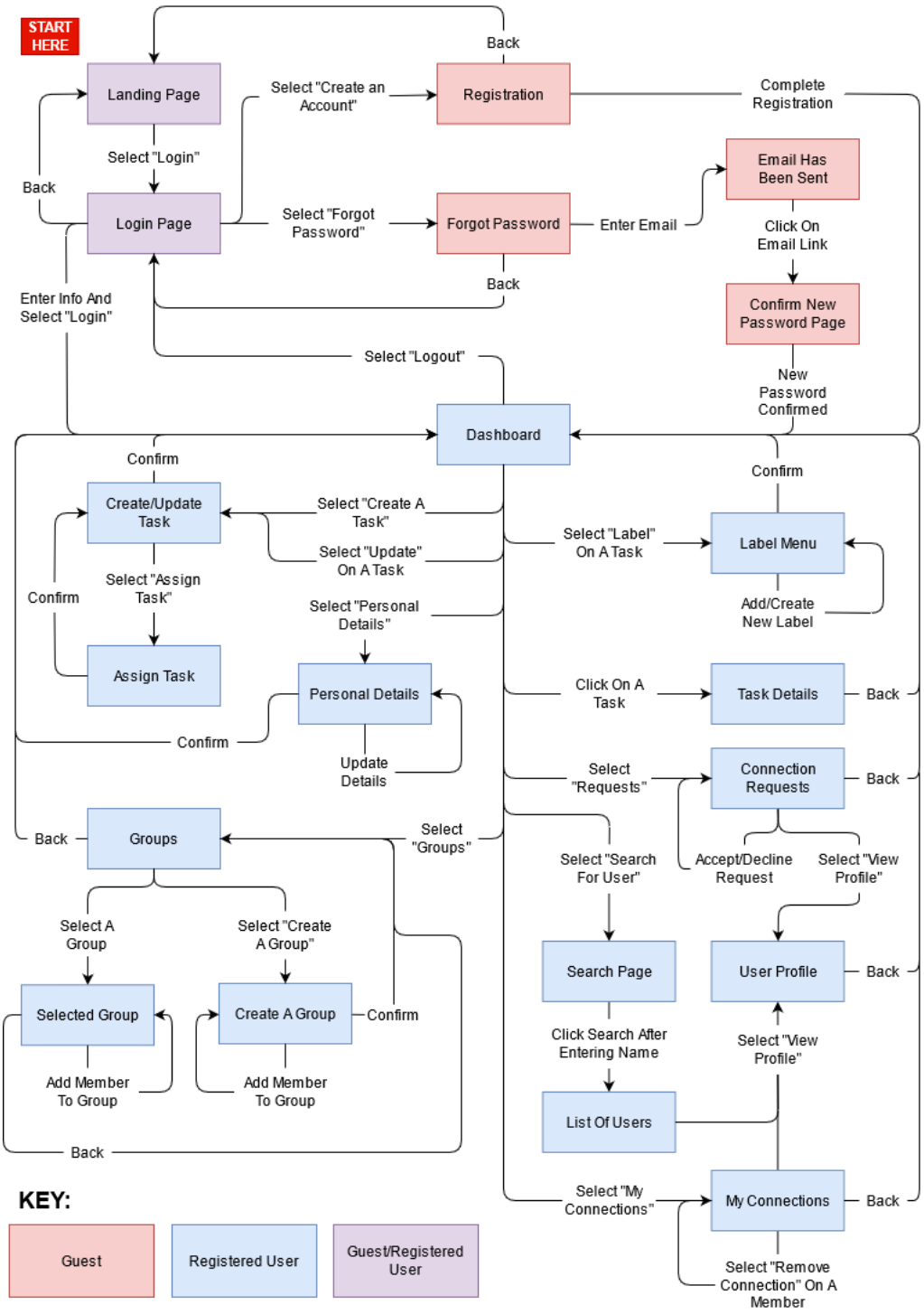
- View list of connected users and their estimated workload over the next week
- View profiles of connected users along with their assigned tasks
- View and create groups

User with assigned task:

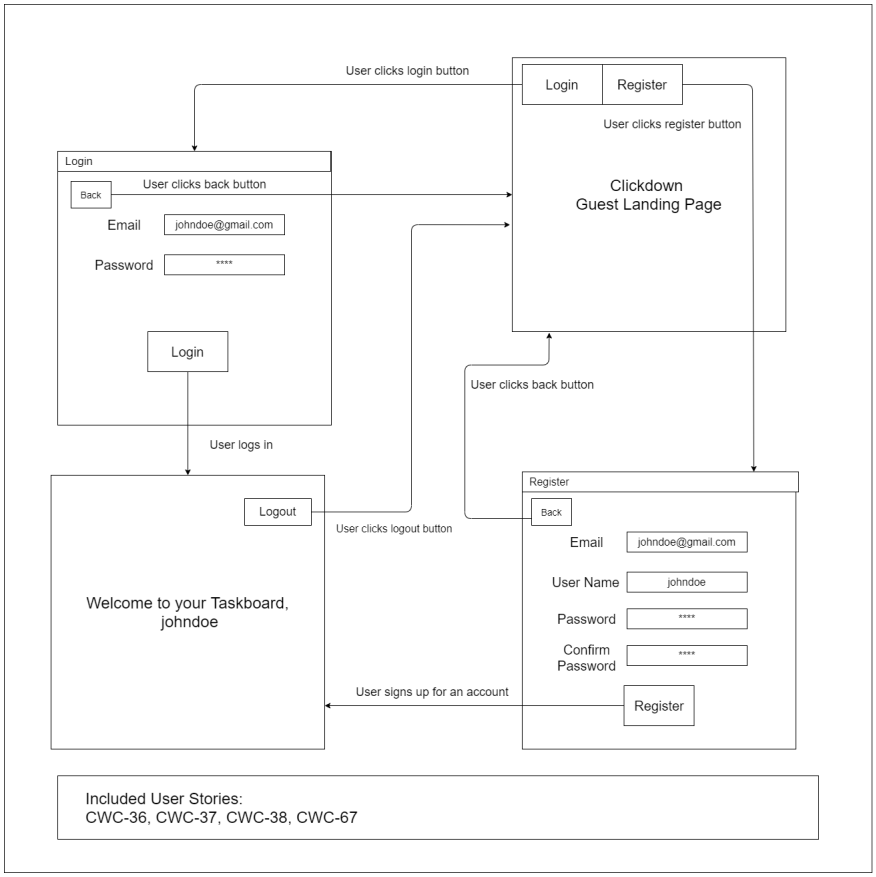
- Search for their tasks by any combination of task-id, title, description, and deadline
- Update task state

4.2 Interface and Flow Diagrams

The following is a series of interface diagrams designed to illustrate the interactions possible with our system by the external actors identified in the above table.

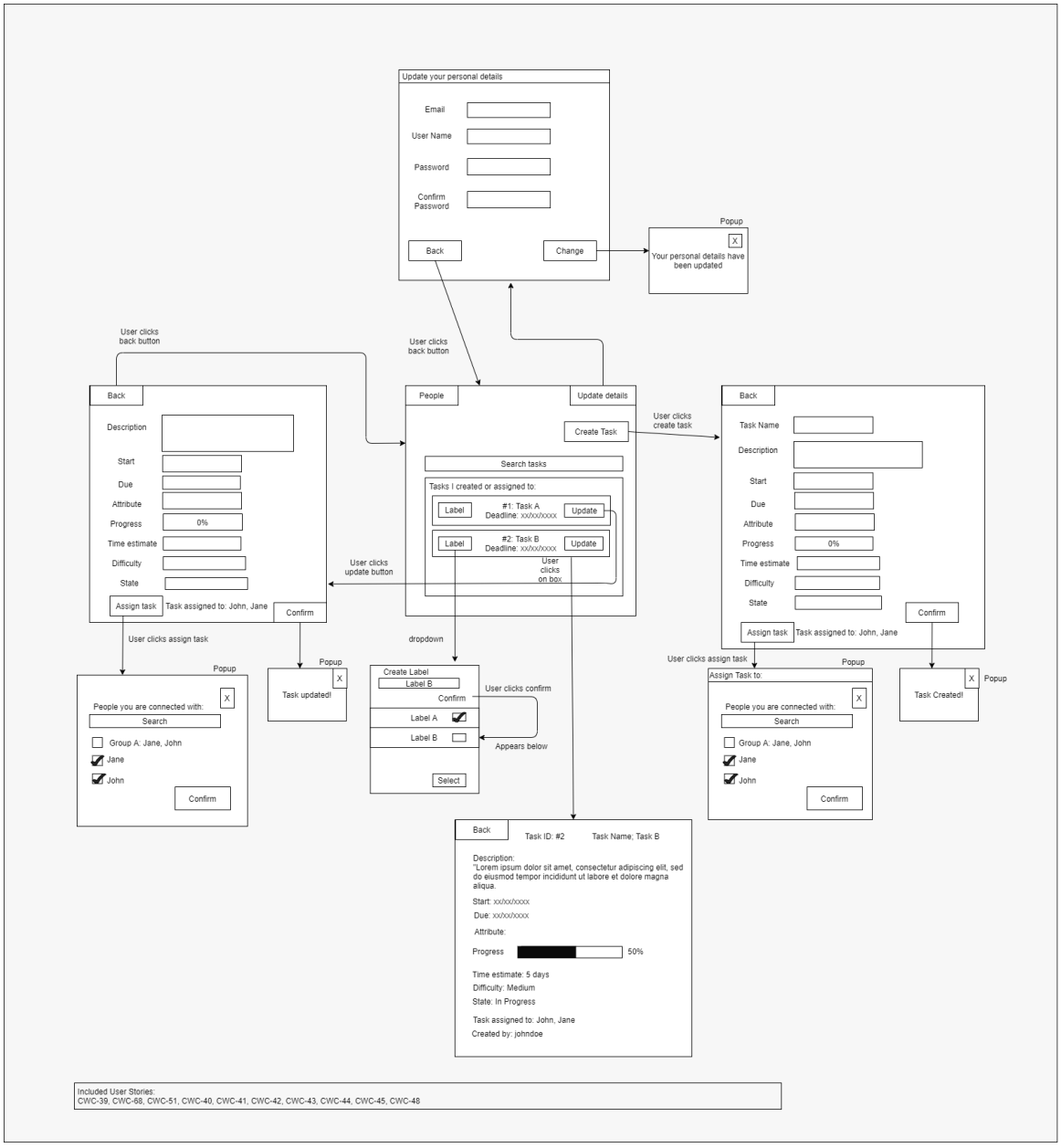

START HERE
Landing Page
Back
Select "Create an Account"
Registration
Complete Registration
Select "Login"
Back
Login Page
Select "Forgot Password"
Forgot Password
Enter Email
Email Has Been Sent
Click On Email Link
Back
Confirm New Password Page
Enter Info And Select "Login"
Select "Logout"
New Password Confirmed
Dashboard
Confirm
Create/Update Task
Select "Create A Task"
Select "Update" On A Task
Select "Label" On A Task
Label Menu
Add/Create New Label
Confirm
Select "Assign Task"
Select "Personal Details"
Assign Task
Personal Details
Click On A Task
Task Details
Back
Confirm
Update Details
Select "Requests"
Connection Requests
Back
Back
Groups
Select "Groups"
Select "Search For User"
Accept/Decline Request
Select "View Profile"
Select A Group
Select "Create A Group"
Search Page
User Profile
Back
Selected Group
Create A Group
Confirm
Click Search After Entering Name
Select "View Profile"
Add Member To Group
Add Member To Group
List Of Users
Back
Select "My Connections"
My Connections
Back
Select "Remove Connection" On A Member
KEY:
Guest
Registered User
Guest/Registered User

4.2.1 Guest Registration and Login [Guests]



On accessing the application, users are greeted by Clickdown's guest landing page outlining the basic functionalities of the app. On this page, users can proceed with two options - they can register if they do not have an account or login if they already do. Submitting a correct email and password on the login page will bring users to their account's taskboard. Similarly for unregistered users, new users are brought to their new account's task board after submitting a new email, username and password on the register page to create a new account. On both the register and login page, users are able to click the back button to return to the guest landing page. Users logged in can also log out of their account by clicking the logout button which will send them back to the guest landing page.

4.2.2 Registering User Interaction - Primarily Task Creation [Registered Users]



The storyboard above models all task-related functions in the system along with the functionality for the updating of personal details. After a user logs

in or registers, they are redirected to their personal home page. On this page, users can create tasks, view tasks assigned to them, and update assigned tasks.

Creating a task

From the home page, users are able to create tasks by clicking on the create task button. On clicking that button, users are brought to the create task screen where they are required to submit relevant information such as a task name and a task description. Tasks are also able to be assigned to groups of users or connected users. When the confirm button on this screen is clicked, a popup is shown confirming that a task is created.

Viewing a task

A list of tasks created by or assigned to the user can be seen on the home screen. When the user clicks on a box relevant to a specific task, they are sent to a screen showing all the information associated with the task.

Updating a task

When the user clicks on the update button on the task box, users are sent to the update task screen. This screen is similar to the create task screen except the name of the task cannot be changed. When users click the confirm button, a popup appears confirming that the task has been updated.

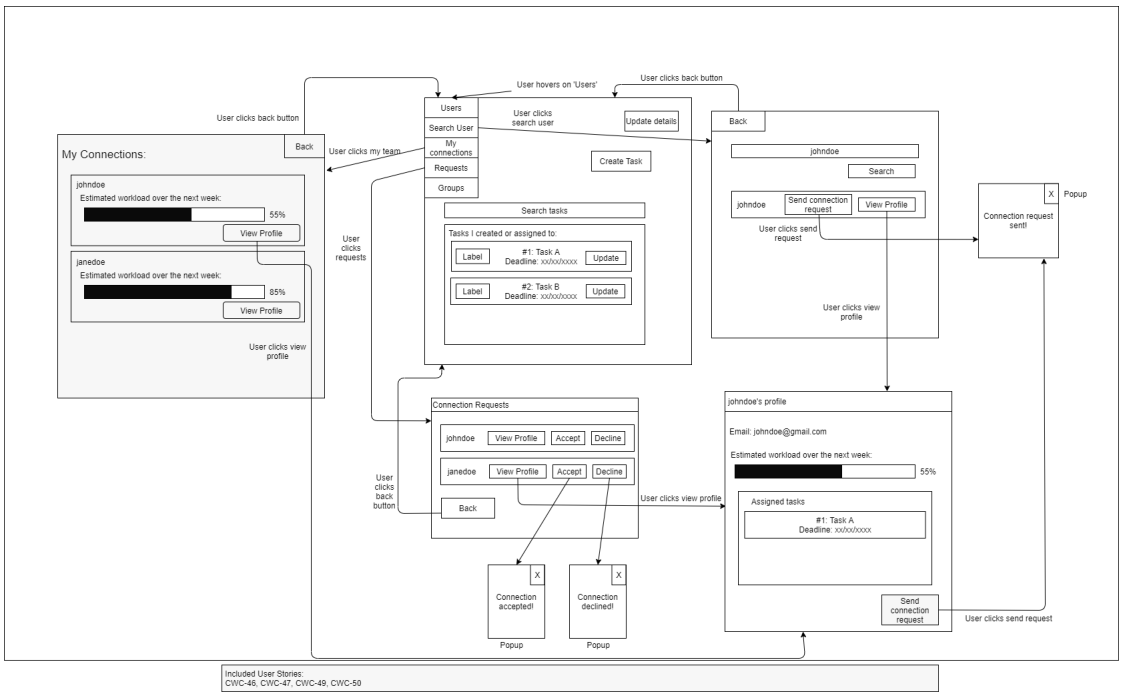
Labels

Users can also attach labels to a task in order to sort them more easily. Users do this by clicking the label button on the task they want to label which will produce a drop-down that allows users to create labels and assign them to the task.

Updating Personal Details

Users can update their personal details by clicking the update details button on their home page. On clicking the button, users are redirected to the update your personal details screen. On this screen, users can change their email, username or password. Clicking the change button will trigger a popup that confirms the changes.

4.3 Interactions With Other Users [Connected Users]



The storyboard above relates to interactions with other users. When the user hovers on the 'Users' button on the top of their home page, a dropdown will be shown allowing users to search users, see their team (connected users), see connection requests or view their groups.

Search User

When a user clicks this button, they will be brought to a search bar that lets users search for other users. When a search is submitted, results will be shown based on the search result. From the results, users can either send a connection request to that user or view their profile.

My connections

On this screen, users are able to see all users they have connected with and their estimated workload over the next week. They are also able to click the view profile button for each user to view the user's full profile.

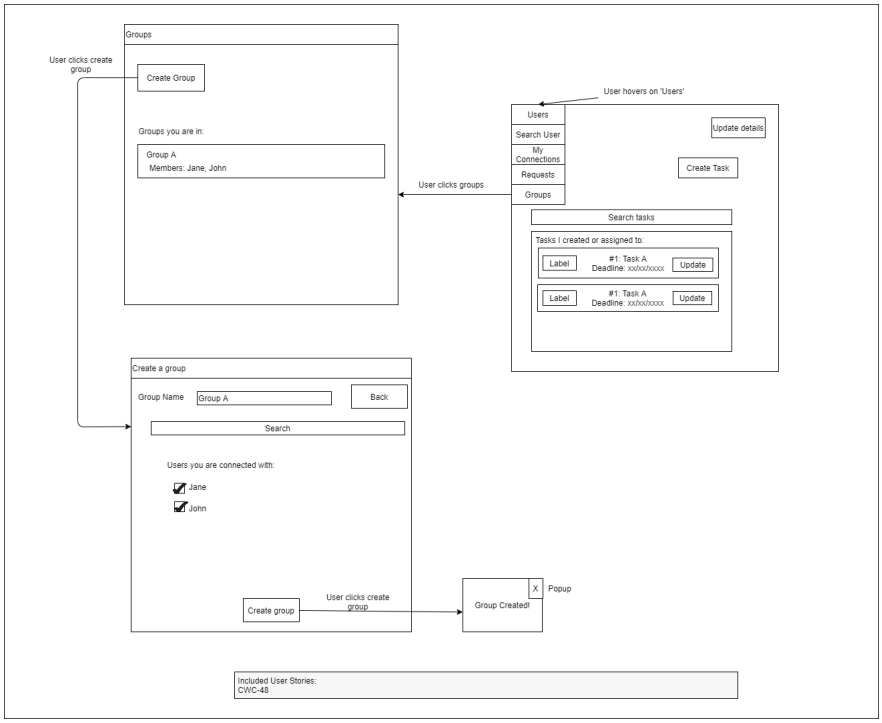
Requests

Here, users can view all connection requests sent to them. They are able to view the profile of the user who sent the request and accept or decline the connection request sent by the user.

Profile

On the profile screen, users can view other user's profiles. They will be able to see the user's password, estimated workload over the next week and tasks they have been assigned. They are also able to send connection requests from the profile screen.

4.4 Creating Groups



The storyboard above is an extension of the 3rd storyboard and allows users to create groups. When the user clicks on the Groups button that appears as a dropdown after a user hovers on the 'Users' button, users can access the groups screen. On this screen, users are able to see the groups they have created or create a new group. When the user clicks the create group button on this screen, they are sent to a page that allows them to create a new group. On this page, users specify a group name and select all connected users they want to form a

group with. On clicking the create group button, a popup appears confirming that the user has created a group.

In a group there is no specific admin. While conducting market research it was stated by several reviews that requiring additional permissions to significantly modify task management boards was seen as prohibitive to maintaining an accurate record of the project's state. This was because it bottlenecked the planning and workflow of teams, becoming more of an inconvenience than an assistive tool. As it is an organisational assistant and not a critical security concern to a business, the functionality gained by allowing this flexibility outweighs the insecurity introduced into the groups.

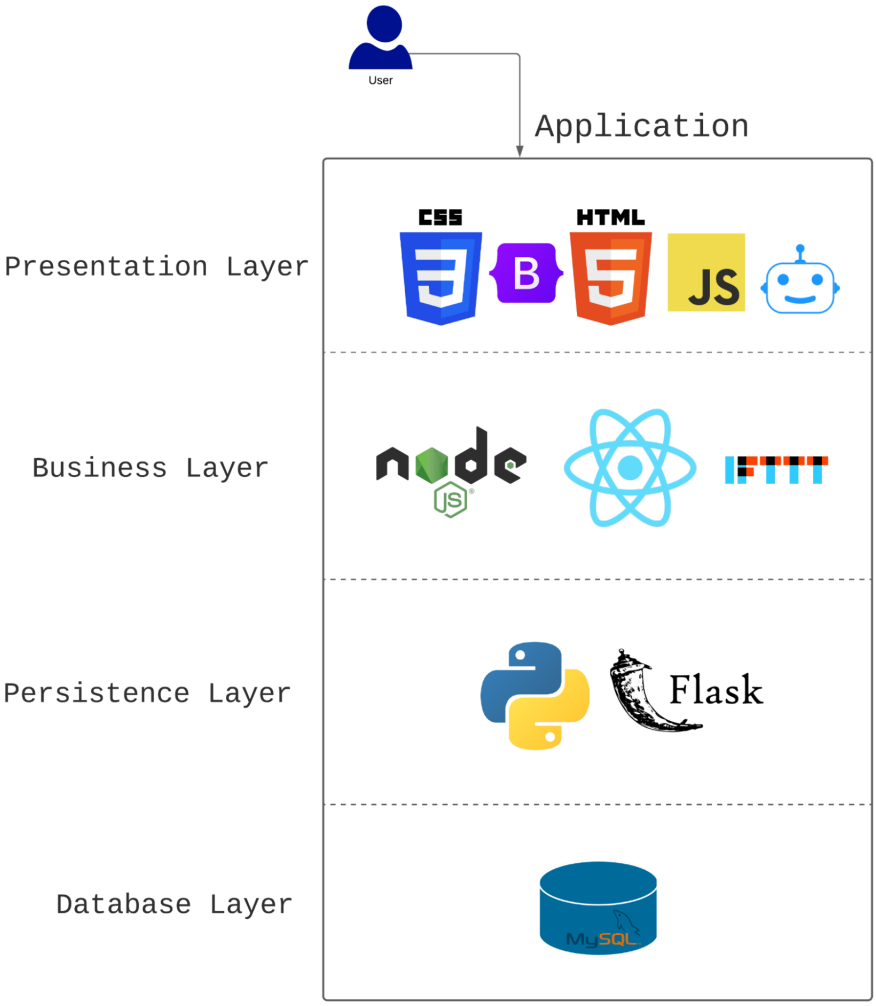
Developers are seen as caretakers of the site, removing inactive users or bad actors as necessary. As this is a niche role, and adding global super admin privileges introduces security concerns, it was decided that they can edit the database directly as necessary to action these changes.

5 Software Architecture Diagrams

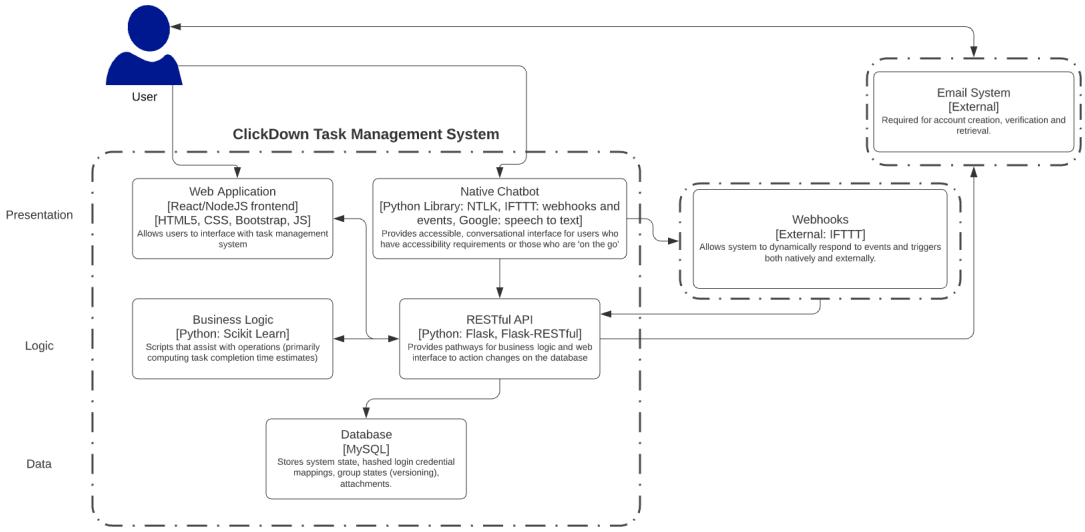
5.1 Overview

The user interacts with the web application online. The touchpoint for this is the React-JS front end. The front end queries a RESTful Flask API that interacts with a MySQL database to provide the back end logic, authorise requests and action tasks on storage.

5.2 Visual Representation of Technologies Used



5.3 System Architecture Container Diagram



5.4 Rationale

5.4.1 Presentation

ReactJS combined with HTML5, CSS, Bootstrap and JS provides the tools to create a responsive, scalable web application interface. Bootstrap, along with HTML5 and CSS will give the app a modern look. React is lightweight enough that running the application should not tax modern browsers and systems, while also giving the interface enough scalability that it could be deployed cross platform to a mobile device if necessary.

5.4.2 Logic

Scikit Learn was selected due to the pre-existing regression models and other statistical analysis tools that it comes pre-package with. This most easily interacts with the RESTful-Flask API backend that was chosen due to its lightweight nature as well as simplicity. Alternatives such as Django were considered however they suffer from significantly more developmental overhead and time investment issues. As Flask is responsive, readily deployable and modular (the entire application won't fail to run in the event of a faulty feature), it was determined as the optimal framework for such a time constrained project.

5.4.3 Database

MySQL was chosen for ease of implementation as well as usefulness in a RESTful context. MongoDB was briefly considered as an alternative due to its reported

ease and flexibility, however again due to time constraints it was decided that we should favour team experience and familiarity.

5.4.4 Externals

Tying an account to an external email address is common practise in virtually all modern applications. As it makes little sense to implement our own SMTP mail server, this is a requirement. Credentialing users via social media accounts (e.g. Facebook, Google) or by Microsoft account has been considered and may be implemented depending on time and sprint progress.

IFTTT was selected as a webhook manager to trigger events based on chat-bot conversation. As it has functionality capable of interacting with an array of external applications, it was decided that this would be the easiest method of porting data into our web app. Google's speech to text libraries and APIs were chosen to allow for direct conversational input.

6 References

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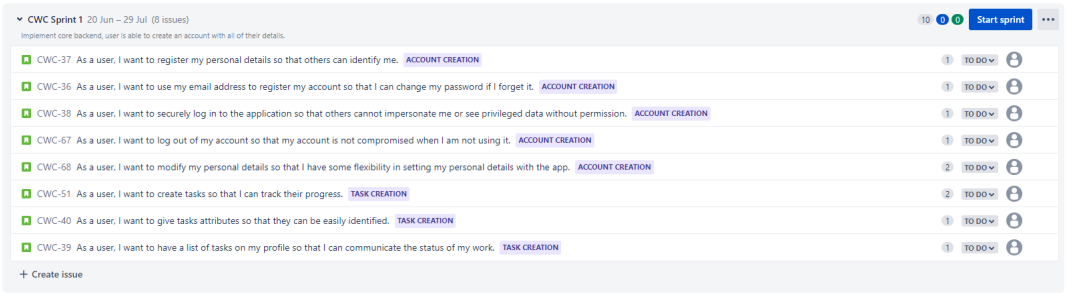
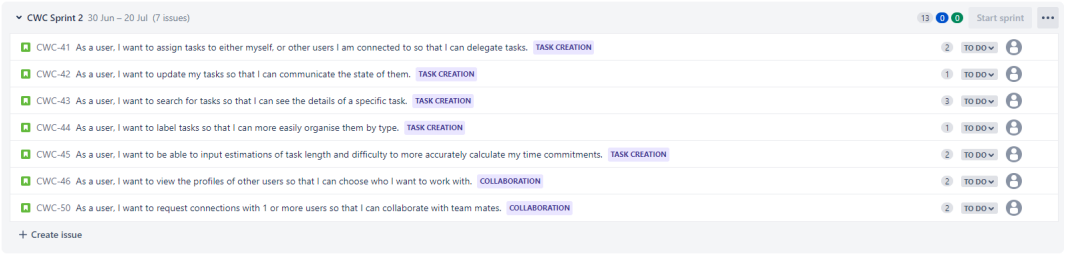
7 Appendix

Screenshots are currently as of: 20 - 06 - 21

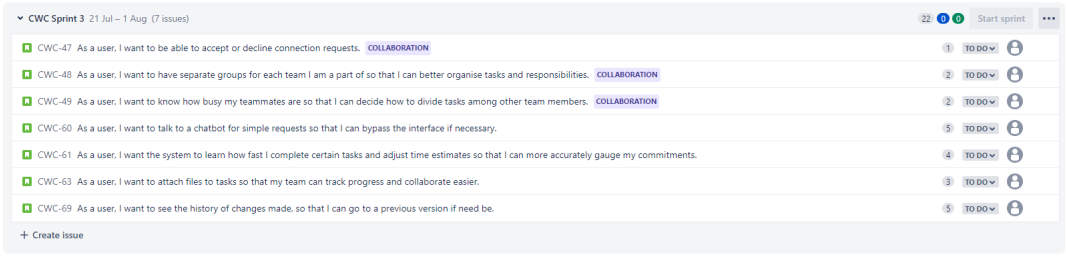
7.1 Figure 1: Jira Sprint 1



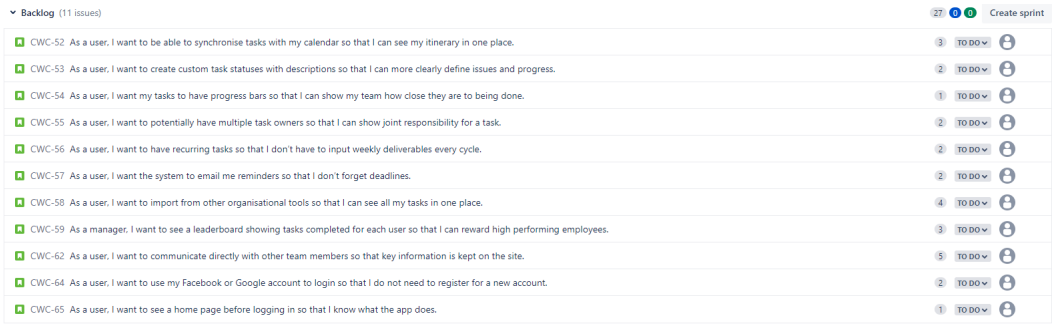
7.2 Figure 2: Jira Sprint 2



7.3 Figure 3: Jira Sprint 3



7.4 Figure 4: Jira Backlog of Potential Extensions



This is a legacy inclusion that details the potential features that we considered, however we will most likely not have time to implement. While nice to have, the features that we intend to accomplish (including extended functionality) are presently allocated into our projected sprints.