

Software Requirements Specification

for

Saya.Life

Version 1.0 approved

Saya

9/17/2022

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Revision History

Name	Date	Reason For Changes	Version
Chris Case	11/15/2022	First draft completed	1.0
Chris Case	3/3/2023	Second draft completed	2.0

1. Introduction

1.1 Purpose

This is a Design Document for a webpage application for the Saya Life Company. Saya Life is a company that monitors water systems and provides sensors for buildings to keep track of their usage for accurate billing, as well as monitoring for small leaks. The webpage would allow both single household owners and multi-unit landlords to monitor water usage and make utilities payments. User's receive notifications about leaks they are experiencing and have the option for in-depth analytics of their water consumption across several metrics. This document describes the scope, objective and goal of the new system. In addition to describing non-functional requirements, this document models the functional requirements with use cases, interaction diagrams, and class models. This document is intended to direct the design and implementation of the target system in an object oriented language.

1.2 Intended Audience and Reading Suggestions

Property Managers, Tenant, Environmental Advocates, Utilities Companies

1.3 Product Scope

The Saya website will allow users to monitor their water usages and levels, as well as receive alerts when a sensor detects a leak. Bill paying will also be featured. However, mobile control of

pipe pressure will not be a feature. The webpage will interface with Saya's existing API for data collection and monitoring. There will also be separate functionality for tenants and landlords allowing landlords to monitor their multiple properties.

The site will replace the current Saya user web page and account management system. This project will not be responsible for creating a database or a new API. Issues around the security of the sites and sensors will not apply to the project beyond password protection.

1.4 Definitions, Acronyms, and Abbreviations

1.5 References

2. Overall Description

2.1 Product Perspective

The purpose of this website is to provide users the ability to monitor their water usage, forecast future water usage, and pay their bills. Through monitoring their water levels, strategies for water conservation and cost saving can be implemented for parties ranging from single residents to multi-unit facilities. Saya's current web application needs to be remade to allow for both tenant and landlord functionality, as well as increased data visualization and analytics. Technical hurdles include interfacing with Saya's sensors and implementing their preferred API with the design team's application. Collecting this data and then performing the categorization and analysis necessary for user comprehension also presents a challenge as well. Access to Saya's API as well as their database will make processing this data in real time possible.

2.2 Product Functions

SAYA.LIFE :

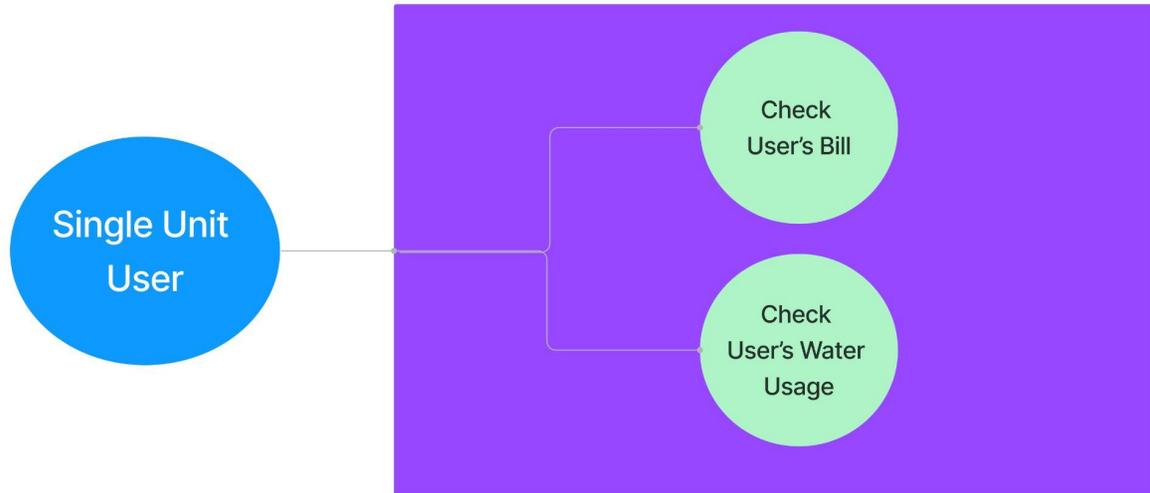
- will allow users to monitor their water consumption with live metrics
- provide feedback from their water sensors to customers
- Users will be able to pay their monthly water bill
- Landlords will be able to monitor individual tenant water usage in a given building.

2.3

User Classes and Characteristics

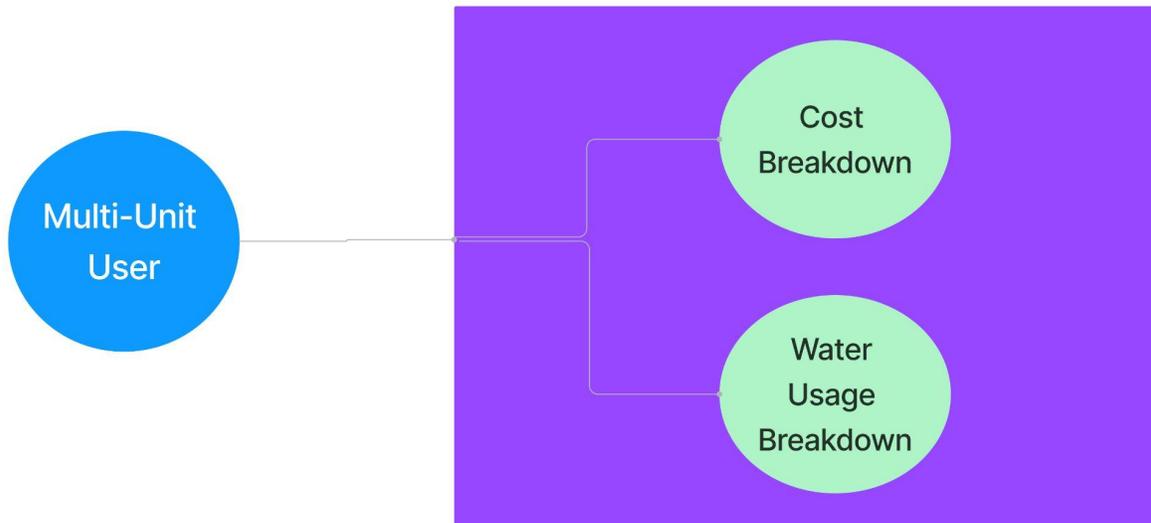
Tenants:

Users only managing data for a single property/residence or people using the most limited functionality of the application. Basic features will be to check water usage and pay their bill.



Landlords/Property-Owners/Multi-Unit Users:

Multi-Unit Users(MUU) will have the ability to monitor all of their properties' water consumption, with detailed breakdowns and analysis for each property. Combined analysis for all properties included additionally.



We also have included four personas, laying out different types of users that may use our product, with varying levels of experience and desire for depth of function.

2.4

Operating Environment

Website Application will function on all web service providers and operating systems

2.5

Design and Implementation Constraints

- **Communication Constraints:** Due to the breadth of the teams/managers/etc for this project, communication in a timely manner will prove difficult. This is especially true as it pertains to the team gaining insight from the wider company or clarification on a deliverable from the customer.
- **Time Constraints:** As this website development project coincides with other projects many of the developers will be working on for other classes, proper time management and allocation must be adhered to. Scheduling and the frequent updating/checking of the team JIRA page will ensure that nothing is missed and adequate time is allocated for the completion of each task.

- Hardware Constraints: Communication with Saya's sensors for water level detection is imperative if the site is going to be capable of real time metric analysis or if the user is able to adjust their water levels.

2.6

User Documentation

- Software Requirements Specification
- Software Design Document

2.7

Assumptions and Dependencies

- React community support
- Saya API access

2.8

Apportioning of Requirements

N/A

3.

External Interface Requirements

3.1

User Interfaces

1. Landlord User
 - 1.1. Dashboard
 - 1.1.1. The system shall display a sidebar with links to all other module pages.
 - 1.1.2. The system shall display the user's information at the top of the page.
 - 1.1.2.1. The display will show the name and address of the user.
 - 1.1.3. The system shall display a notification box that displays the most recent notifications for users connected to the landlord's account.

- 1.1.3.1. The system shall display Four features: Unit NO, Description, Data/Time and Action
- 1.1.3.2. The system shall display the unit No the notification message is for
- 1.1.3.3. The system shall display a general summary of the description for the notification.
- 1.1.3.4. The system shall display the date and time of the received notification
- 1.1.3.5. The system shall display if there was any action taken for that notification
- 1.1.4. The System shall display a calendar.
- 1.1.5. The system shall display a quick action bar.
 - 1.1.5.1. The quick action bar contains a set threshold, add tenants, send email, and export report button.
- 1.1.6. The system shall display a graph from the analytics page.

1.2. Billing

- 1.2.1. The system shall display a Billing table with information for the user on each tenant
 - 1.2.1.1. The system shall include the features Tenant Name, Invoice Number, Meter Number, Total Amount (\$), Payable Amount (\$), Bill Month, and Status for each tenant.
 - 1.2.1.2. The system shall display the tenant's name for the user to identify
 - 1.2.1.3. The system shall display an invoice number which is unique to each tenant
 - 1.2.1.4. The system shall display a meter number categorizing each tenant's meter
 - 1.2.1.5. The system shall display the total amount due as well as the payable amount for each tenant
 - 1.2.1.6. The system shall display the tenant's billing month and year
 - 1.2.1.7. The system shall display a status to the user whether the bill was paid, forwarded, or pending

1.3. Notifications

- 1.3.1. The system shall display a Notification History table that lists every alert regarding certain units within the time frame specified by the user.
 - 1.3.1.1. The system shall include the following features per unit: Unit No, Message, Gateway MAC, Meter Number, Notification Type, and Notification Local Time.
 - 1.3.1.2. The system shall display a unit number for the user to identify.

- 1.3.1.3. The system shall display a message that informs the user about a notification.
- 1.3.1.4. The system shall display a gateway address to trace the notification's target.
- 1.3.1.5. The system shall display a meter number categorizing each tenant's meter.
- 1.3.1.6. The system shall display a notification type that informs the user about a notification's type.
- 1.3.1.7. The system shall display a notification local time to inform the user about the time the notification was sent.

1.4. Settings

- 1.4.1. The system shall display fields for updating user account information and user information.
 - 1.4.1.1. The system shall display a field for account name.
 - 1.4.1.2. The system shall display a field for country code.
 - 1.4.1.3. The system shall display a field for name prefix.
 - 1.4.1.4. The system shall display a field for email.
 - 1.4.1.5. The system shall display a field phone number.
 - 1.4.1.6. The system shall display a field for the main account.
 - 1.4.1.7. The system shall display a field for first name.
 - 1.4.1.8. The system shall display a field for last name.
 - 1.4.1.9. The system shall display a field email.
 - 1.4.1.10. The system shall display a field for date format.
 - 1.4.1.11. The system shall display a field for password.
 - 1.4.1.12. The system shall display a field for confirming password.

1.5. Hardware

- 1.5.1. The system shall display a dashboard with Fixture Number, Usage History Graphs, Tenant information, and Current Water usage.
- 1.5.2. The system shall display a table with information for each water fixture
 - 1.5.2.1. The system shall include the number of the fixture
 - 1.5.2.2. The system shall display the name of the tenant for the user to identify
 - 1.5.2.3. The system shall display a fixture number that is unique to each tenant
 - 1.5.2.4. The system shall display the total consumption per fixture
 - 1.5.2.5. The system shall display the status of each fixture
- 1.5.3. The system shall display the usage history of each fixture
 - 1.5.3.1. The system shall include a graph that compares the current month usage versus the previous month usage.
 - 1.5.3.2. The system shall let the user view the usage history by month

- 1.5.3.3. The system shall display water usage in gallons.
 - 1.5.4. The system shall display the current water usage by each fixture
 - 1.5.4.1. The system shall display the current water usage of the fixture for the month
 - 1.5.4.2. The system shall display the water usage in gallons
 - 1.6. Analytics
 - 1.6.1. The system shall display charts, tables, and graphs detailing the water usage and estimated costs for each property owned by the user
 - 1.6.2. The system shall display all the data sorted by day, month, year, and all time usage
 - 1.7. Tenants
 - 1.7.1. The system shall display fields for adding a new tenant.
 - 1.7.2. The system shall display a table of all tenants associated with a landlord's account.
- 2. Single tenant User
 - 2.1. Dashboard
 - 2.1.1. The system shall display a sidebar with links to all other module pages.
 - 2.1.2. The system shall display the user's information at the top of the page.
 - 2.1.2.1. The display will show the name and address of the user.
 - 2.1.3. The system shall display a notification box that displays the most recent notifications for users connected to the landlord's account.
 - 2.1.3.1. The system shall display Four features: Unit NO, Description, Data/Time and Action
 - 2.1.3.2. The system shall display the unit No the notification message is for
 - 2.1.3.3. The system shall display a general summary of the description for the notification.
 - 2.1.3.4. The system shall display the date and time of the received notification
 - 2.1.3.5. The system shall display if there was any action taken for that notification
 - 2.1.4. The System shall display a calendar.
 - 2.1.5. The system shall display a quick action bar.
 - 2.1.5.1. The quick action bar contains a set threshold, add tenants, send email, and export report button.
 - 2.1.6. The system shall display a graph from the analytics page.
 - 2.2. Billing
 - 2.2.1. The system shall display a Billing table with information for the user on each tenant

- 2.2.1.1. The system shall include the features Tenant Name, Invoice Number, Meter Number, Total Amount (\$), Payable Amount (\$), Bill Month, and Status for each tenant.
- 2.2.1.2. The system shall display the tenant's name for the user to identify
- 2.2.1.3. The system shall display an invoice number which is unique to each tenant
- 2.2.1.4. The system shall display a meter number categorizing each tenant's meter
- 2.2.1.5. The system shall display the total amount due as well as the payable amount for each tenant
- 2.2.1.6. The system shall display the tenant's billing month and year
- 2.2.1.7. The system shall display a status to the user whether the bill was paid, forwarded, or pending

2.3. Notifications

- 2.3.1. The system shall display a Notification History table that lists every alert for the tenants unit.
 - 2.3.1.1. The system shall include the following features: Unit No, Message, Gateway MAC, Meter Number, Notification Type, and Notification Local Time.
 - 2.3.1.2. The system shall display a unit number for the user to identify.
 - 2.3.1.3. The system shall display a message that informs the user about a notification.
 - 2.3.1.4. The system shall display a gateway address to trace the notification's target.
 - 2.3.1.5. The system shall display a meter number categorizing each meter.
 - 2.3.1.6. The system shall display a notification type that informs the user about a notification's type.
 - 2.3.1.7. The system shall display a notification local time to inform the user about the time the notification was sent.

2.4. Settings

- 2.4.1. The system shall display fields for updating user account information and user information.
 - 2.4.1.1. The system shall display a field for account name.
 - 2.4.1.2. The system shall display a field for country code.
 - 2.4.1.3. The system shall display a field for name prefix.
 - 2.4.1.4. The system shall display a field for email.
 - 2.4.1.5. The system shall display a field phone number.
 - 2.4.1.6. The system shall display a field for the main account.
 - 2.4.1.7. The system shall display a field for first name.
 - 2.4.1.8. The system shall display a field for last name.

- 2.4.1.9. The system shall display a field email.
- 2.4.1.10. The system shall display a field for date format.
- 2.4.1.11. The system shall display a field for password.
- 2.4.1.12. The system shall display a field for confirming password.
- 2.5. Hardware
 - 2.5.1. The system shall display a dashboard with Fixture Number, Usage History Graphs, Tenant information, and Current Water usage.
 - 2.5.2. The system shall display a table with information for each water fixture
 - 2.5.2.1. The system shall include the number of the fixture
 - 2.5.2.2. The system shall display the name of the tenant for the user to identify
 - 2.5.2.3. The system shall display a fixture number that is unique to each tenant
 - 2.5.2.4. The system shall display the total consumption per fixture
 - 2.5.2.5. The system shall display the status of each fixture
 - 2.5.3. The system shall display the usage history of each fixture
 - 2.5.3.1. The system shall include a graph that compares the current month usage versus the previous month usage.
 - 2.5.3.2. The system shall let the user view the usage history by month
 - 2.5.3.3. The system shall display water usage in gallons.
 - 2.5.4. The system shall display the current water usage by each fixture
 - 2.5.4.1. The system shall display the current water usage of the fixture for the month
 - 2.5.4.2. The system shall display the water usage in gallons
- 2.6. Analytics
 - 2.6.1. The system shall display charts, tables, and graphs detailing the water usage and estimated costs for the individual user
 - 2.6.2. The system shall display all the data sorted by day, month, year, and all time usage

3.2

Hardware Interfaces

Web application will just require a computer with an internet connection

3.3

Software Interfaces

The product will use the Saya.Life API and a React/Java script based coding language to design the web page

3.4

Communications Interfaces

N/A

4.

Requirements Specification

4.1

Functional Requirements

1. Multi tenant User
 - 1.1. Dashboard
 - 1.1.1. The system shall allow for the user to set a threshold on their water usage
 - 1.1.1.1. The system shall allow the user to filter and set a water meter threshold by Gateway, Mode or Water Meter Number
 - 1.1.2. The system shall allow the user to email their landlord
 - 1.1.3. The system shall display historical data for the user
 - 1.1.3.1. The system shall allow the user to display historical data according to the type of data, select Date and individual tenant.
 - 1.1.4. The system shall allow the user to refresh the data
 - 1.2. Billing
 - 1.2.1. The system shall allow the user to download each billing file containing all the information on the tenant
 - 1.2.2. The system shall allow the user to sort each feature by descending, ascending, or alphabetical order
 - 1.2.3. The system shall allow the user to search by Tenant Name or Invoice Number
 - 1.2.4. The system shall allow the user to select the Month and Year in order to find specific tenants
 - 1.2.5. The system shall allow the user to download all the tenants billing files at once
 - 1.2.6. The system shall allow the user to display either 10, 20, 30, 50, or 100 rows of tenants billing information
 - 1.2.7. The system shall allow the user to scroll through the pages of tenants
 - 1.2.8. The system shall allow the user to contact a SAYA.life employee
 - 1.3. Notifications

- 1.3.1. The system shall allow the user to search by Gateway or Meter.
 - 1.3.1.1. The system shall allow the user to enter the From Date as well as the To Date in order to display the notification history for a given time frame.
 - 1.3.1.2. The system shall allow the user to download all the notifications listed in the Notification History table.
 - 1.3.1.3. The system shall allow the user to display either 10, 20, 30, 50, or 100 rows of notification history.
 - 1.3.1.4. The system shall allow the user to contact a SAYA.life employee
- 1.4. Hardware
 - 1.4.1. The system should allow the user to select each hardware device from the table.
- 1.5. Settings
 - 1.5.1. The system shall allow the user to change their account/user information
 - 1.5.1.1. The system shall allow the user to change account name.
 - 1.5.1.2. The system shall allow the user to change country code.
 - 1.5.1.3. The system shall allow the user to change name prefixes.
 - 1.5.1.4. The system shall allow the user to change for email.
 - 1.5.1.5. The system shall allow the user to change phone numbers.
 - 1.5.1.6. The system shall allow the user to change for the main account.
 - 1.5.1.7. The system shall allow the user to change for first name.
 - 1.5.1.8. The system shall allow the user to change for last name.
 - 1.5.1.9. The system shall allow the user to change email.
 - 1.5.1.10. The system shall allow the user to change the date format.
 - 1.5.1.11. The system shall allow the user to change the password.
 - 1.5.1.12. The system shall allow the user to change to confirm password.
- 1.6. Tenants
 - 1.6.1. The system shall allow the user to add a new tenant.
 - 1.6.2. The system shall allow the user to select a tenant from the table.
- 1.7. Analytics
 - 1.7.1. The system shall allow the user to select the forecasting data for each property owned
 - 1.7.1.1. The system shall allow the user to view forecasting data based off each fixture/sensor in the property
 - 1.7.2. The system shall allow the user to set goals for usage and the system will display the projected usage/cost if the goals are implemented
- 2. Single Tenant User
 - 2.1. Account Overview
 - 2.1.1. The system shall allow for the user to set a threshold on their water usage

- 2.1.1.1. The system shall allow the user to filter and set a water meter threshold by Gateway, Mode or Water Meter Number
 - 2.1.2. The system shall allow the user to email their landlord
 - 2.1.3. The system shall display historical data for the user
 - 2.1.3.1. The system shall allow the user to display historical data according to the type of data, select Date and individual tenant.
 - 2.1.4. The system shall allow the user to refresh the data
 - 2.1.5. The system shall allow the user to engage with a SAYA Life employee
- 2.2. Billing
 - 2.2.1. The system shall allow the user to download each billing file containing all the information on the tenant
 - 2.2.2. The system shall allow the user to sort each feature by descending, ascending, or alphabetical order
 - 2.2.3. The system shall allow the user to search by Tenant Name or Invoice Number
 - 2.2.4. The system shall allow the user to select the Month and Year in order to find specific tenants
 - 2.2.5. The system shall allow the user to download all the tenants billing files at once
 - 2.2.6. The system shall allow the user to display either 10, 20, 30, 50, or 100 rows of tenants billing information
 - 2.2.7. The system shall allow the user to scroll through the pages of tenants
 - 2.2.8. The system shall allow the user to contact a SAYA.life employee
- 2.3. Notifications
 - 2.3.1. The system shall allow the user to search by Gateway or Meter.
 - 2.3.1.1. The system shall allow the user to enter the From Date as well as the To Date in order to display the notification history for a given time frame.
 - 2.3.1.2. The system shall allow the user to download all the notifications listed in the Notification History table.
 - 2.3.1.3. The system shall allow the user to display either 10, 20, 30, 50, or 100 rows of notification history.
 - 2.3.1.4. The system shall allow the user to contact a SAYA.life employee
- 2.4. Settings
 - 2.4.1. The system shall allow the user to change their account/user information
 - 2.4.1.1. The system shall allow the user to change account name.
 - 2.4.1.2. The system shall allow the user to change country code.
 - 2.4.1.3. The system shall allow the user to change name prefixes.
 - 2.4.1.4. The system shall allow the user to change for email.
 - 2.4.1.5. The system shall allow the user to change phone numbers.

- 2.4.1.6. The system shall allow the user to change for the main account.
- 2.4.1.7. The system shall allow the user to change for first name.
- 2.4.1.8. The system shall allow the user to change for last name.
- 2.4.1.9. The system shall allow the user to change email.
- 2.4.1.10. The system shall allow the user to change the date format.
- 2.4.1.11. The system shall allow the user to change the password.
- 2.4.1.12. The system shall allow the user to change to confirm password.

2.5. Analytics

- 2.5.1. The system shall allow the user to select the forecasting data for their unit.
 - 2.5.1.1. The system shall allow the user to view forecasting data based off each fixture/sensor in the property
- 2.5.2. The system shall allow the user to set goals for usage and the system will display the projected usage/cost if the goals are implemented

4.2

External Interface Requirements

- The web site requires a database to store the sensor data
- The web site shall not disclose any of the user's billing information
- The web site shall secure sensor data and access
- The web site requires a computer or mobile device with internet access

4.3

Logical Database Requirements

Database requirements have been implemented by Saya software team

4.4

Design Constraints

There are no design constraints other than the usage to certain data languages and framework:

- Swift
- HTML

5.

Other Nonfunctional Requirements

5.1 Performance Requirements

Users shall be able to access their perspective dashboard and achieve full functionality (threshold creation, account viewing, billing)

5.2

Safety Requirements

No safety issues will cause a loss of user data or confidentiality

5.3

Security Requirements

All accounts will require a login function and other security protocols will be handled by Saya software team

5.4

Software Quality Attributes

The qualities most desired by the customer for their webpage include:

- Modularity: ability for the user to fully customize their experience and prioritize information they find most important.
- Accessibility: a stable environment which users' are able to access at any time
- Billing: the ability to safely process payments

5.5

Business Rules

The software is public so no restrictions need be put in place

6.

Legal and Ethical Considerations

Since our product will be involved with billing information it is important to ensure that users personal identifiable information(PII) is secured. We are working in tandem with Saya's current software team to make sure the product is secure and users are able to process their payments. Currently, we are exploring options to process payments directly through the Saya App and eliminate the third party

payment processing method they currently use. This step will only proceed if we are able to make sure there is no change of a leak of users information.

Our product also interfaces with water sensors, some of which have the functionality of being able to turn off a user's water. This is achieved remotely, so it is required that an attacker not be able to gain access to these sensor controls. Saya currently employs a closed system and their own proprietary software for the sensors and the software that retrieves the data from their sensors. Our team will ensure that we maintain this security as we update their site and create no exploits for attackers to gain access to a user's system.

Appendix A: Glossary

Appendix B: Analysis Models

