Development Artifacts

SOFTWARE DESIGN - REQUIREMENTS TO RELEASE: 2825344

This course brings together important concepts, tools, techniques, and best practices in a hands-on software development project. Learners will iteratively develop requirements, design, code, and test to release several versions of a product, thereby experiencing a small-scale software development life cycle.

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Introduction

This document summarizes the guiding vision of the Red30 project. The following sections provide an overview of the product, its stakeholders, its key features, and other requirements that form the foundation for the project going forward.

01. Background

H+ Sport and Red30 Tech are fictitious companies created by LinkedIn Corporation, or its affiliates, solely for the creation and development of educational training materials. Any resemblance to real products or services is purely coincidental. Information provided about the products or services is also fictitious and should not be construed as representative of actual products or services on the market in a similar product or service category.

02. Case Study

This case study involves two fictitious companies: H+ Sport and Red30 Tech. Red30 Tech is a software development firm that is going to build a software for H+ Sport, a company that offers health-related products and services. One of H+ Sport's services offers diet consulting to its customers through a panel of professional health coaches.

H+ Sport customers can register for this service and become H+ members. H+ then connects each member to a coach who then becomes the member's diet consultant. All members need to maintain a daily diet log in a paper notebook and their coaches then look at members' diet logs to make recommendations, as needed. However, the coaches often feel constrained by paper-based diet logs as they are hard to analyze and to find nutritional trends in the data. Also, members often log incomplete data, and whatever data they do log lacks any information about the nutrients and ingredients in their food items.

To this purpose, H+ Sport has partnered with Red30 to build an application for members and coaches to track their diets and perform useful analysis.

Sprint 1 - Project Kickoff

03. Problem and Vision Statements

Problem statement

The problem of	*paper-based diet logs*
affects	*the quality of diet recommendations made by coaches*
the impact of which is	*that the coaches are not able to analyze diet logs and the members do not get the expected value*
a successful solution would be	*a software application that makes it* • *Easy for members to log their diets* • *Insightful for coaches to analyze their members' diet logs*

Product position statement

For	*H+ Sport members*
Who	*want to track their diet and get good diet recommendations from their coaches*
The product Red30	*is a diet-tracking application*
That	*offers intuitive and insightful features about nutrition*
Unlike	*other diet-tracking platforms or products*
Our product	*offers complete control over member data to H+ Sport*

04. Elicit and Specify Requirements

Stakeholder descriptions

Table 1: Stakeholder summary

Name	*Description*	*Product responsibilities*	*Project responsibilities*
H+ Sport members	*Registered customers for diet-consulting service*	*Maintain a daily log of all the food they consume.* *Share diet log with their coaches every time they meet with them.*	*If part of selected user group, provide inputs through interviews, surveys, and feedback on beta releases of the product.*
H+ Sport coaches	*Health and fitness professionals registered as professional health and fitness coaches with H+ Sport to offer their consulting services*	*Track and analyze their customers' diet log.* *Offer diet recommendations according to members' health profile.* *Ensure that members' data privacy needs are met.*	*Provide inputs through interviews, meetings, product reviews, and feedback on beta releases of the product.*
Red30 project team	*Employees of Red30 Tech working on the project*	*Make the product design flexible and adaptable for future needs.* *Make the product design scalable to accommodate more coaches and members in future.* *Make the product user interface intuitive for quick product adoption.*	*Deliver the software as per the requirements communicated by H+ Sport.* *Keep H+ Sport stakeholders informed on project progress, as needed.*
Project sponsors	*Founder and CEO of H+ Sport; founder and CEO of Red30 Tech*	*Provide long-term vision and goals to identify product requirements.* *Help the team prioritize product features to align with short- and long-term goals.*	*Participate in key project review meetings and provide feedback and guidance.*

Product overview

Table 2: Product needs and features

Need	Feature	Priority
Look up information on food products.	Search for food products by product name.	1
	Display food product's nutritional content.	1
	Display food product's ingredients.	-
	Search food product by nutrient.	-
	Search food product by ingredient.	-
Compare nutritional values of different food products.	Compare two food products by their nutrients.	2
	Compare two food products by their ingredients.	-
Maintain member's diet log.	Record a meal (food products, quantity, date, time).	4
	View meal records.	4
Maintain member's health profile.	Create user account.	3
	Create health profile.	5
Track and analyze.	See nutritional analytics on members' diet.	5
	See analytics on feature usage by users.	-

Red30	Sprint 1 - Project Kickoff
Development Artifacts	Elicit and Specify Requirements

Use case diagram

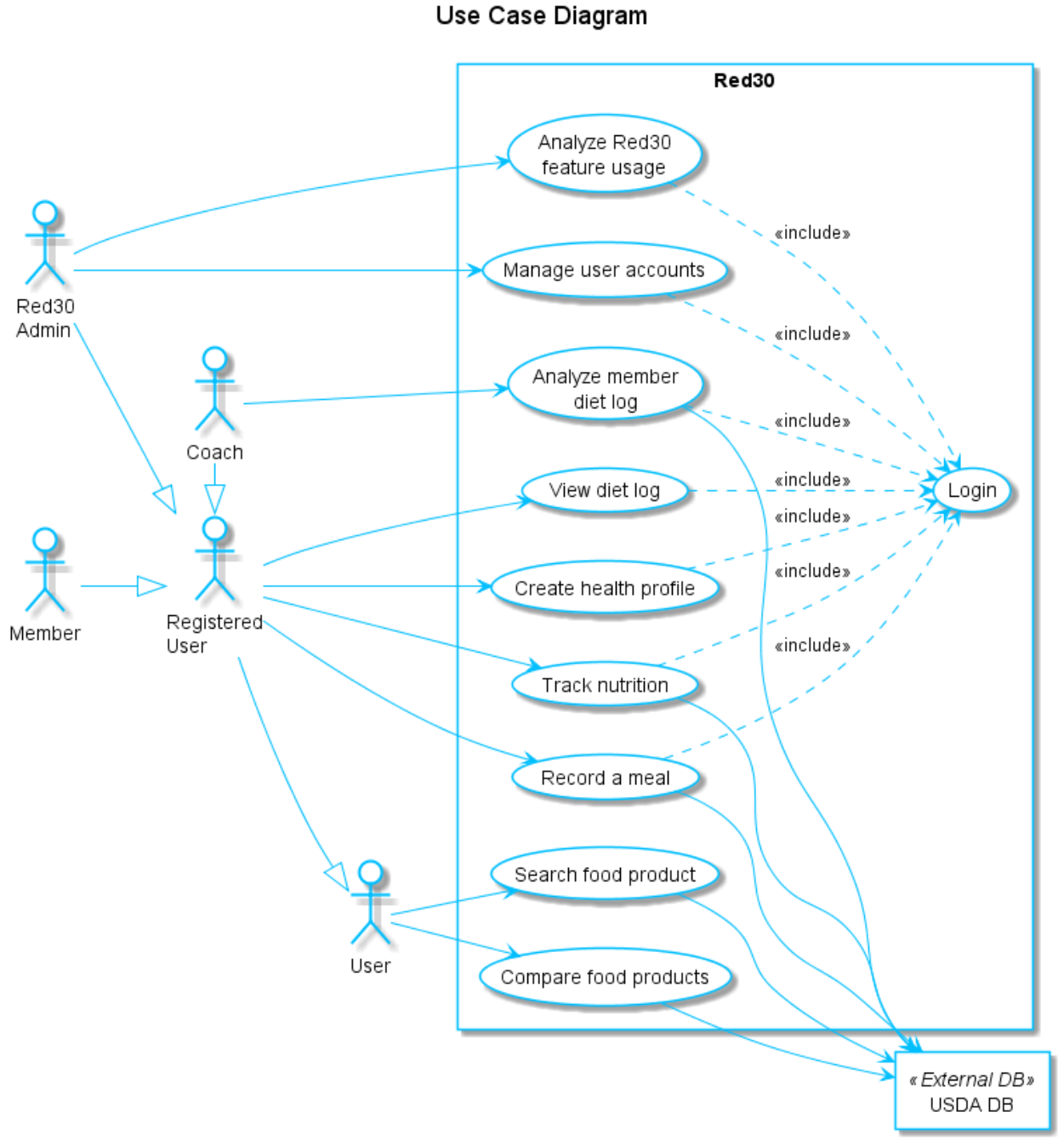

Figure 1: Use case diagram

05. Requirement Validation

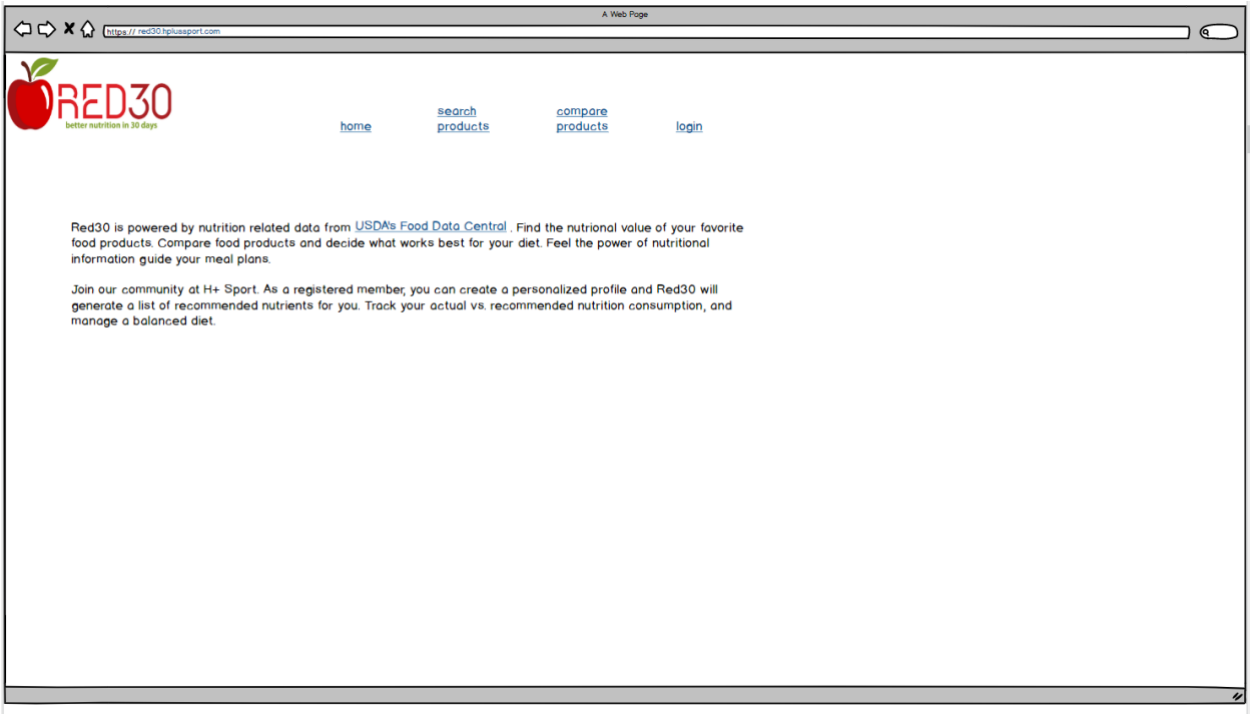

Figure 2: UI mockup

06. Technology Validation

Application architecture

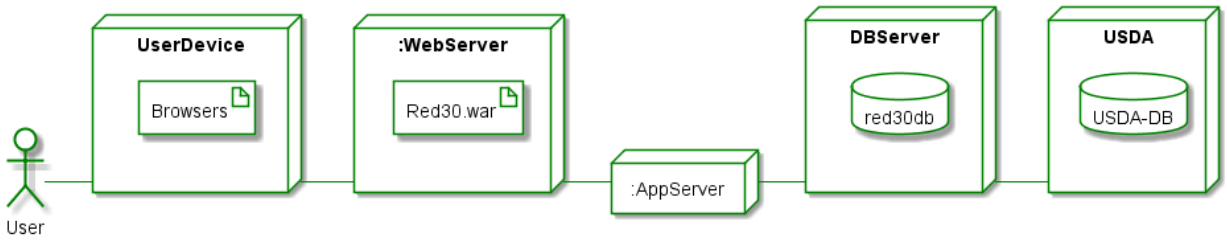

Figure 3: Application layers

Development environment architecture

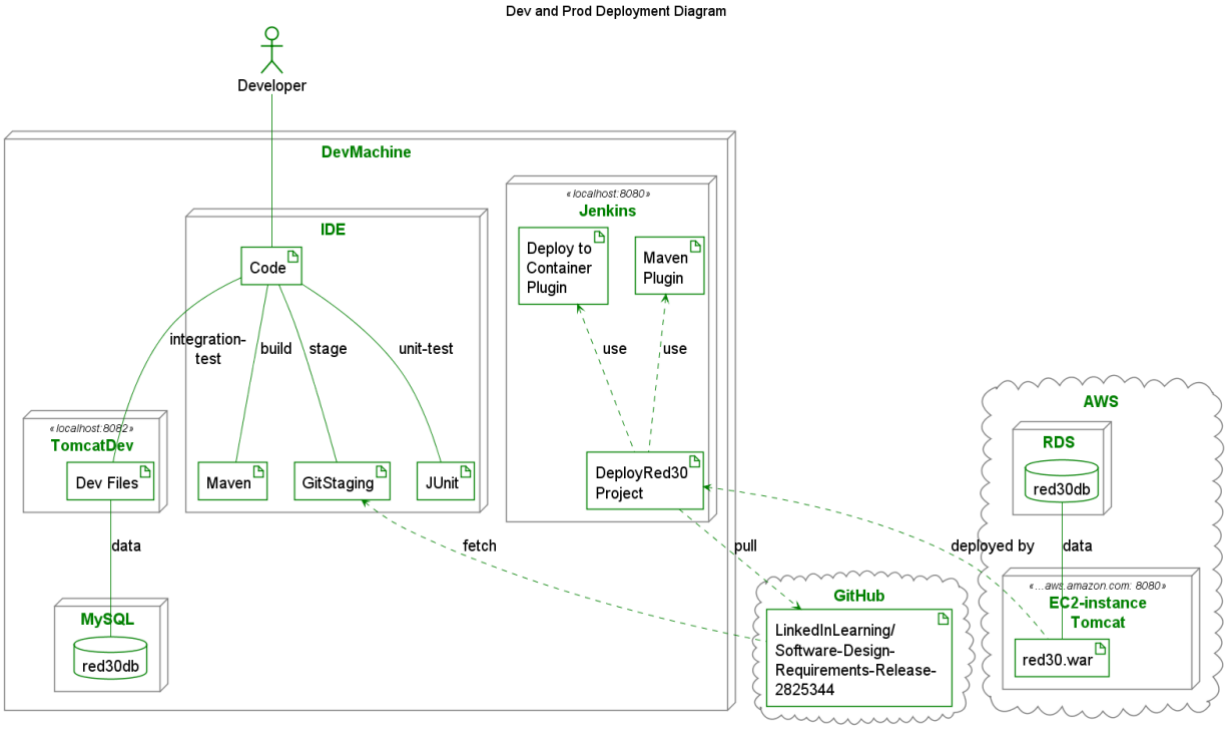

Figure 4: Dev and prod deployment diagram

Data model

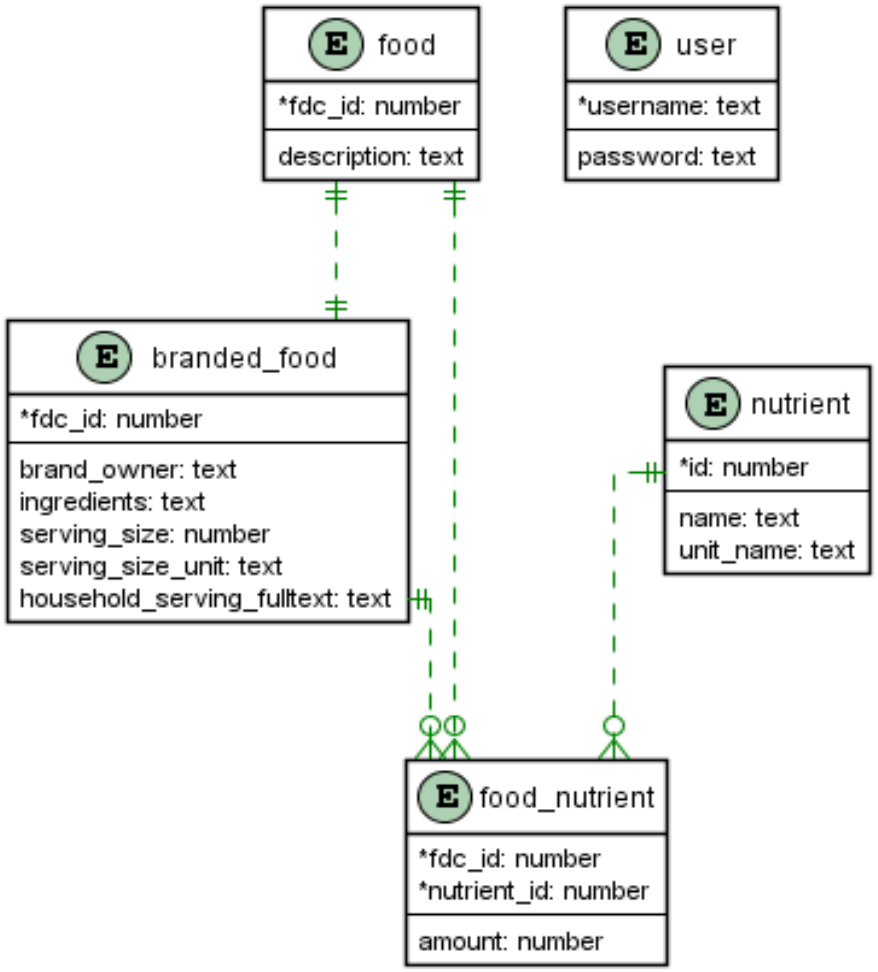

Figure 5: Data model

07. Proof of Concept - Setup

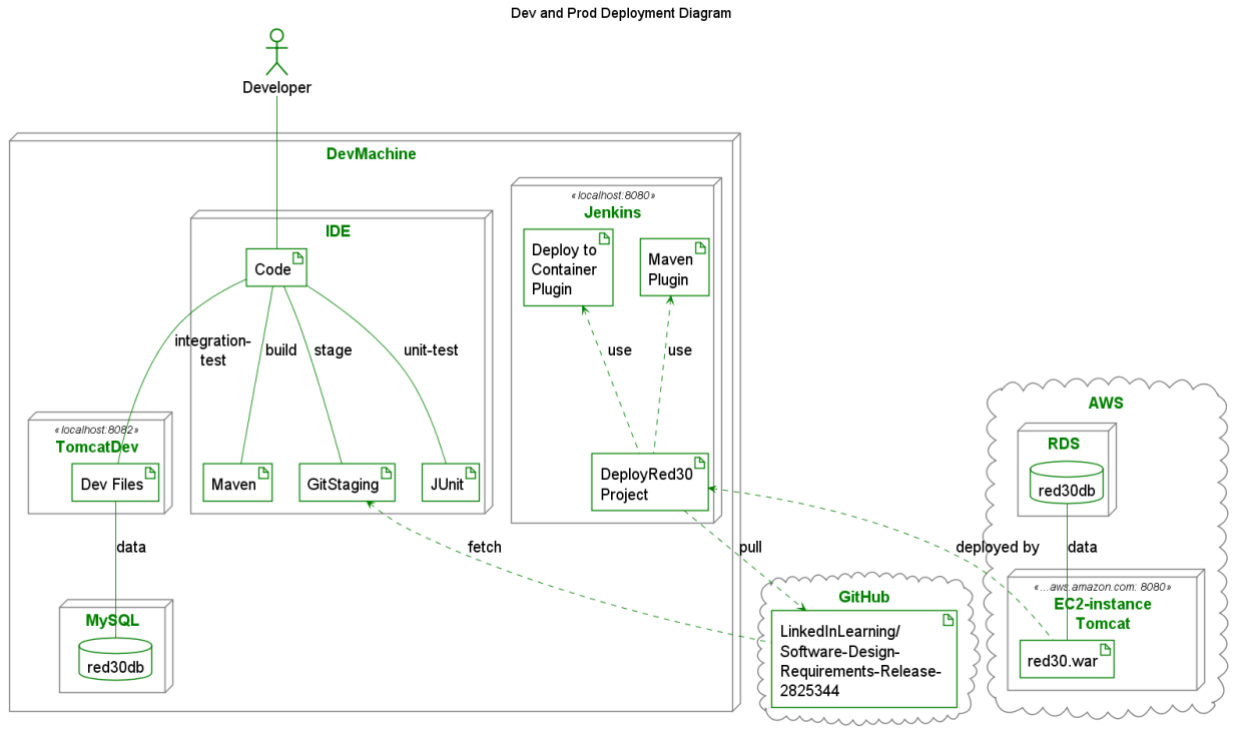

Figure 6: POC setup

08. Proof of Concept - Implementation

Revised use case diagram

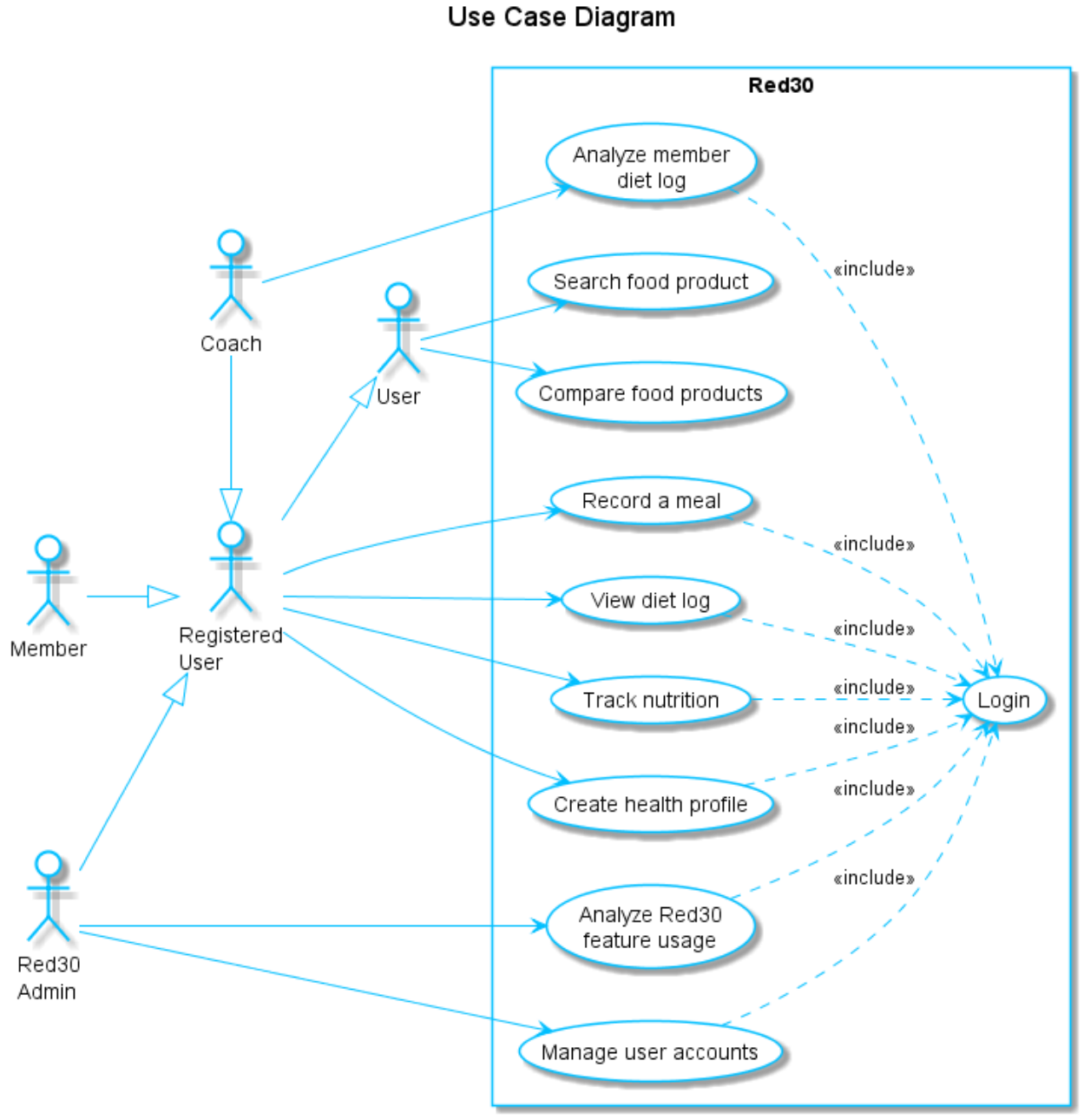

Figure 7: Revised use case diagram

Sequence diagram - POC

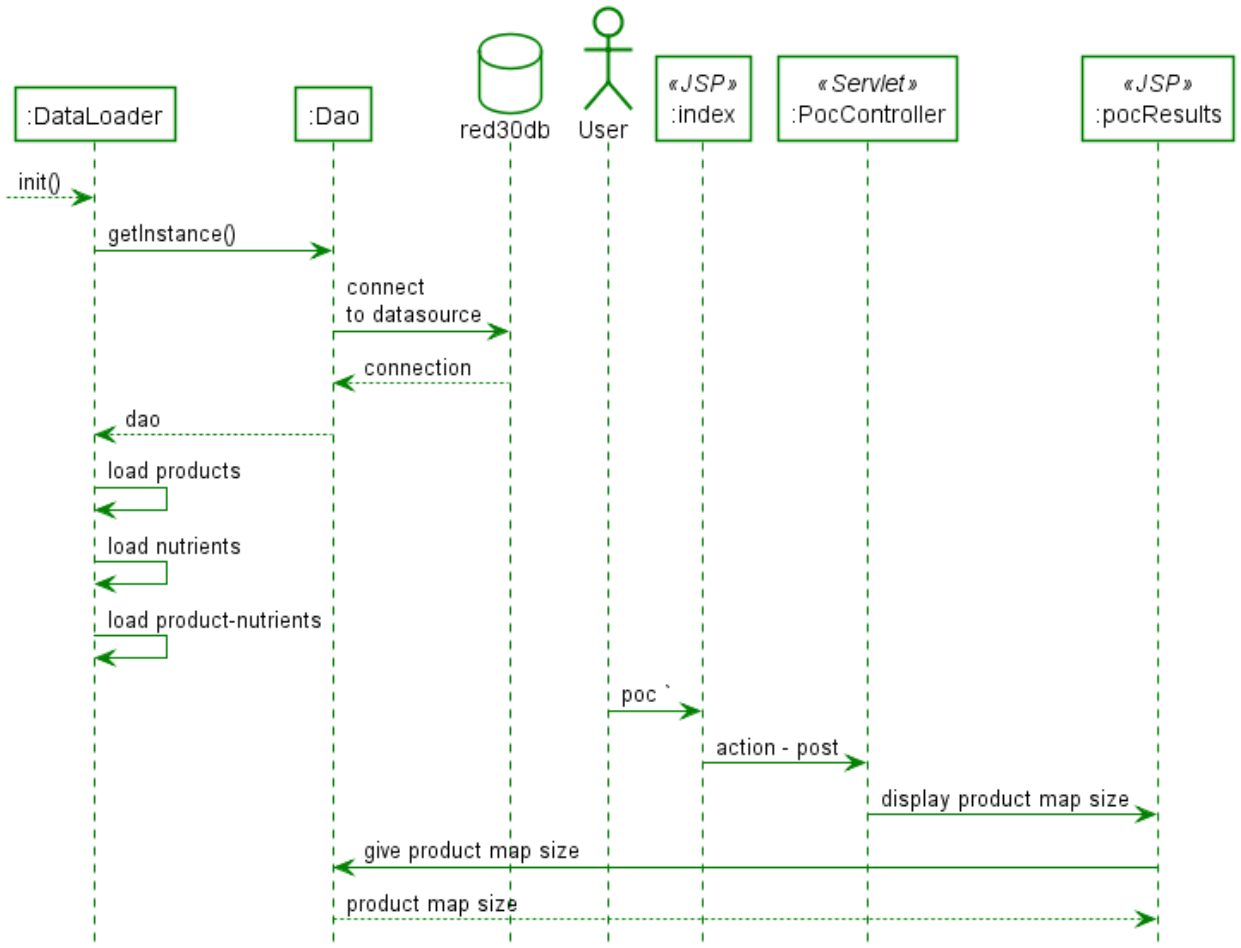

Figure 8: Sequence diagram - POC

Class diagram - POC

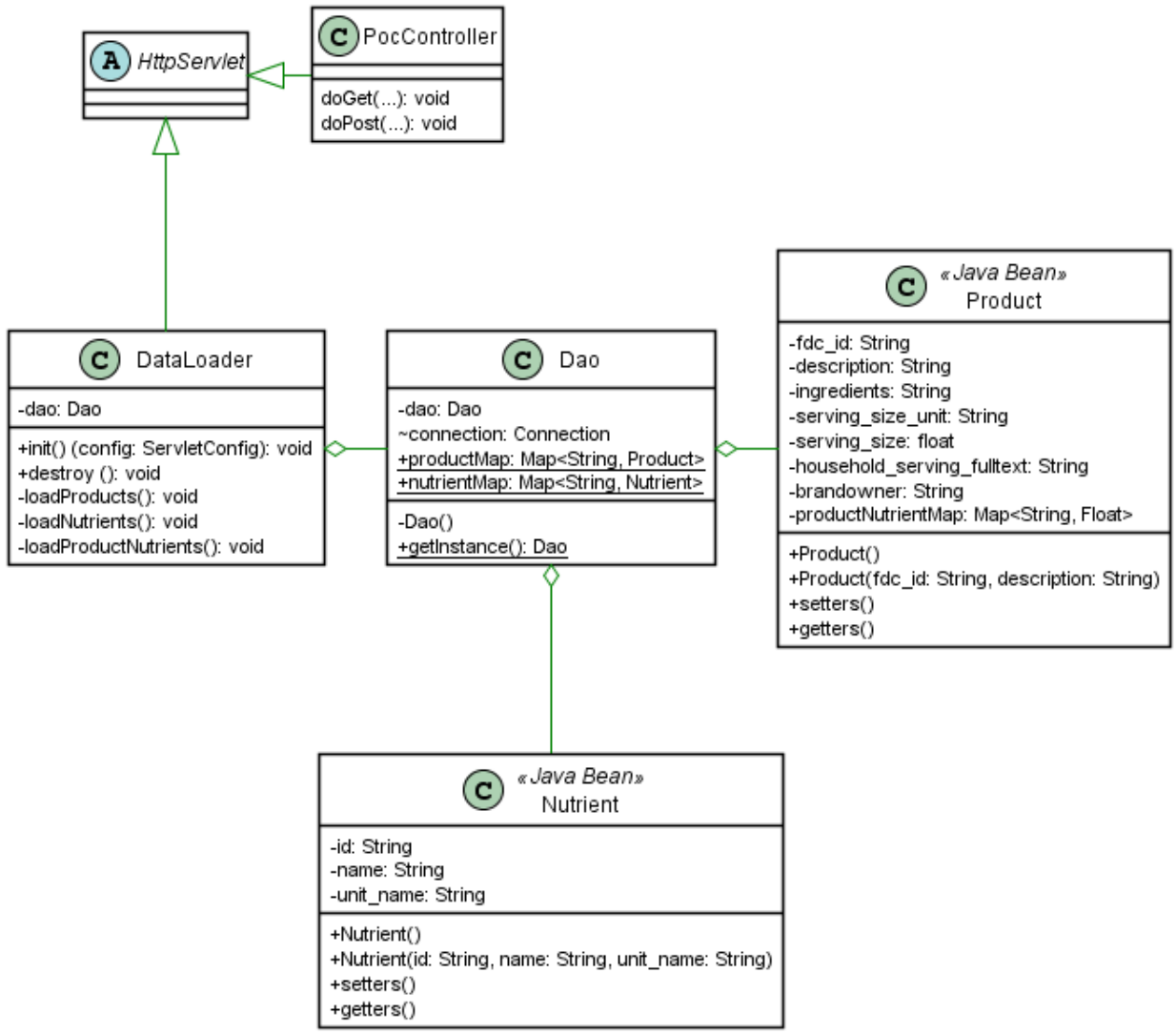

Figure 9: Class diagram - POC

09. Challenge 1

Change POC to print number of nutrients in Red30 database.

10. Solution 1

No change in use case diagram, sequence diagram, class diagram, or data model.

Sprint 2 - Beta

01. Prepare Sprint Backlog

User story - Search food products

As a user, I want to search for a food product by name so that I can see its nutritional value.

Use case - Search food products

Primary actor: User

Secondary actor: None

Description: In this use case, a user can search food products using some keywords.

Precondition: User should have access to the web application at the application URL.

Basic flow

1. User chooses the option to search for a product.
2. Red30 provides option to enter search keywords.
3. User enters the keywords.
4. Red30 displays the list of products with those keywords in their names and the list of nutrients and their quantities in them.
5. Use case ends successfully.

Alternate flow

From step 4 of basic flow:

1. Red30 does not find any matching products with the given keywords.
2. Red30 displays a message that no matching products are found.
3. Use case ends unsuccessfully.

Postcondition: Search results are displayed.

Domain model

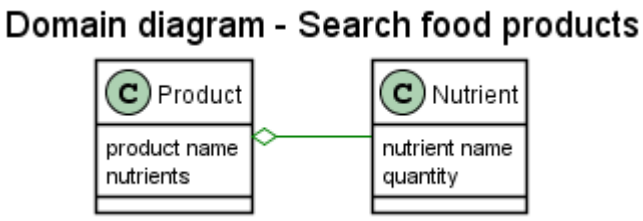

Figure 10: Domain diagram - Search food products

02. Build Models

UI mockup - Search food products

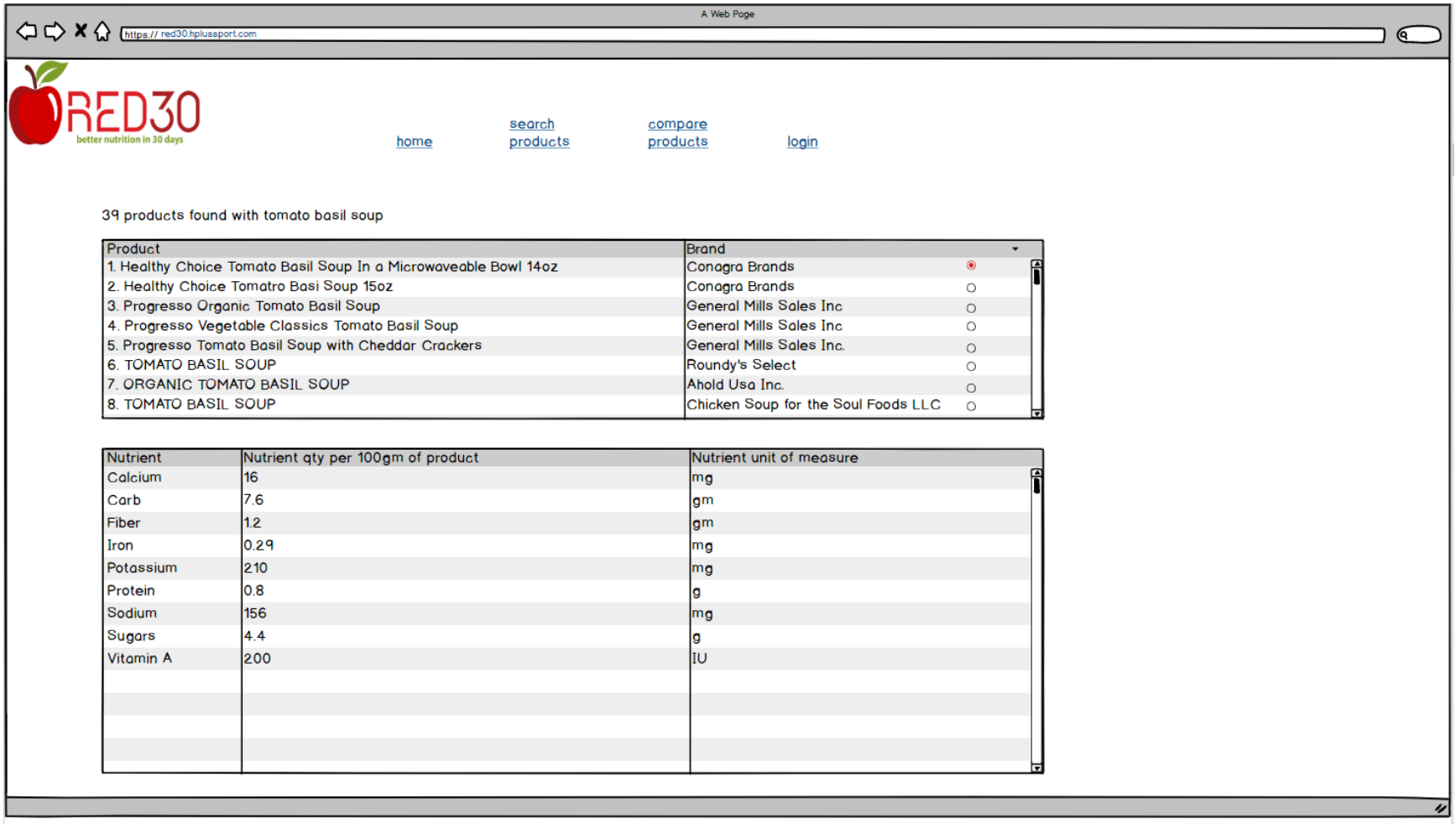

Figure 11: UI mockup - Search food products

Red30	Sprint 2 - Beta
Development Artifacts	Build Models

Sequence diagram - Search food products

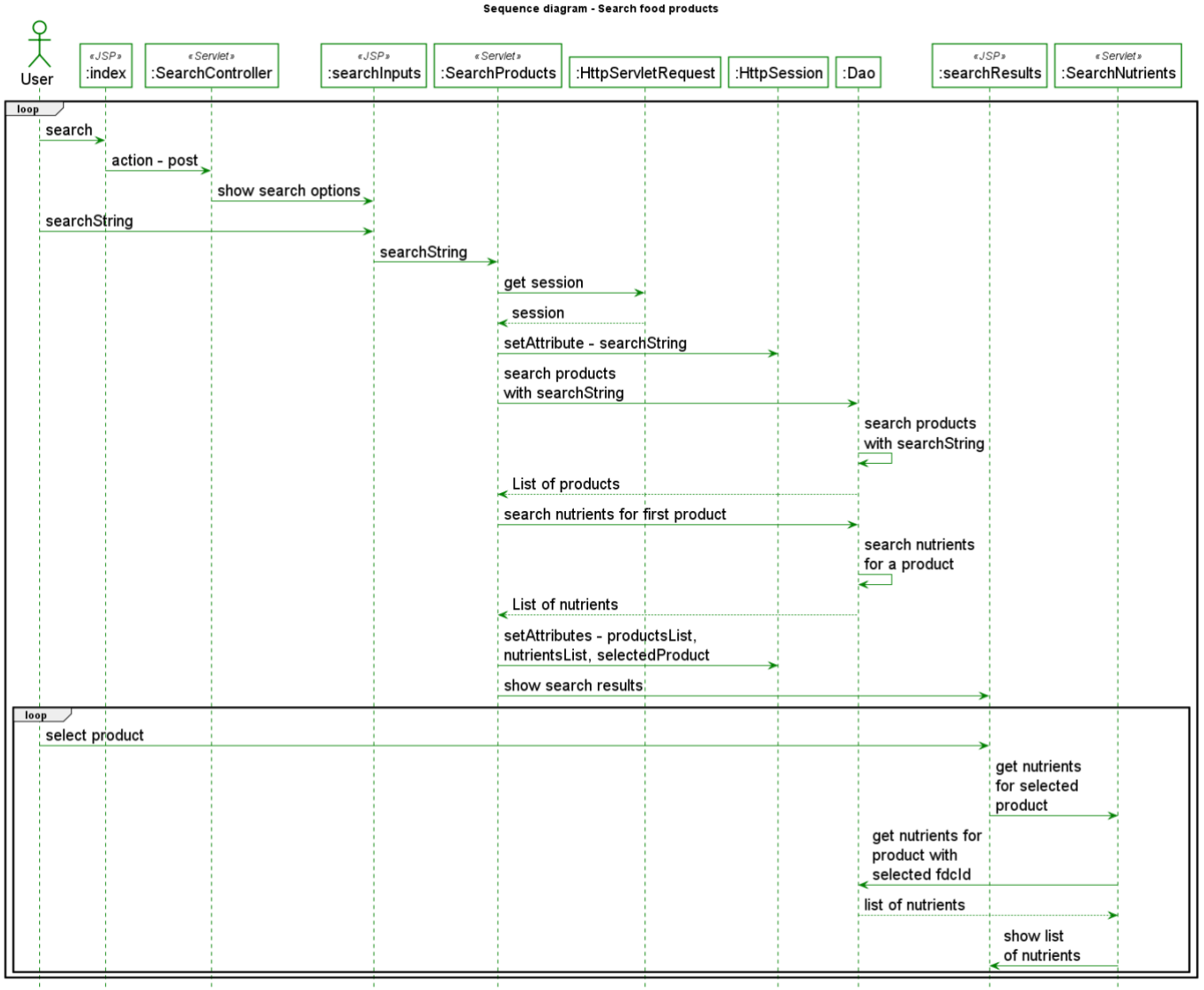

Figure 12: Sequence diagram - Search use case

Red30	Sprint 2 - Beta
Development Artifacts	Build Models

Class diagram - Search food products

Class diagram - Detailed

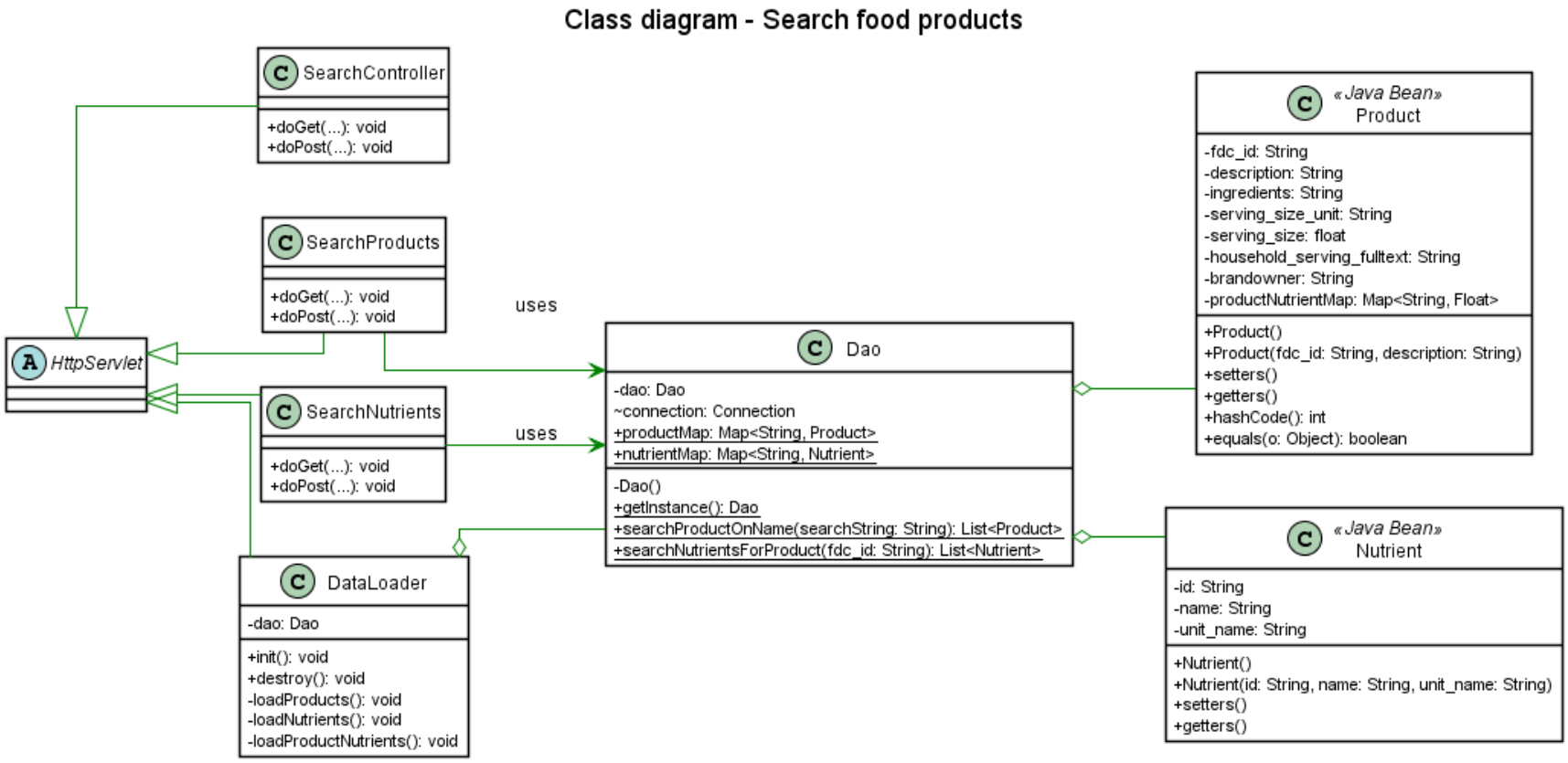

Figure 13: Class diagram - Search food product (detailed)

Class diagram - Summary

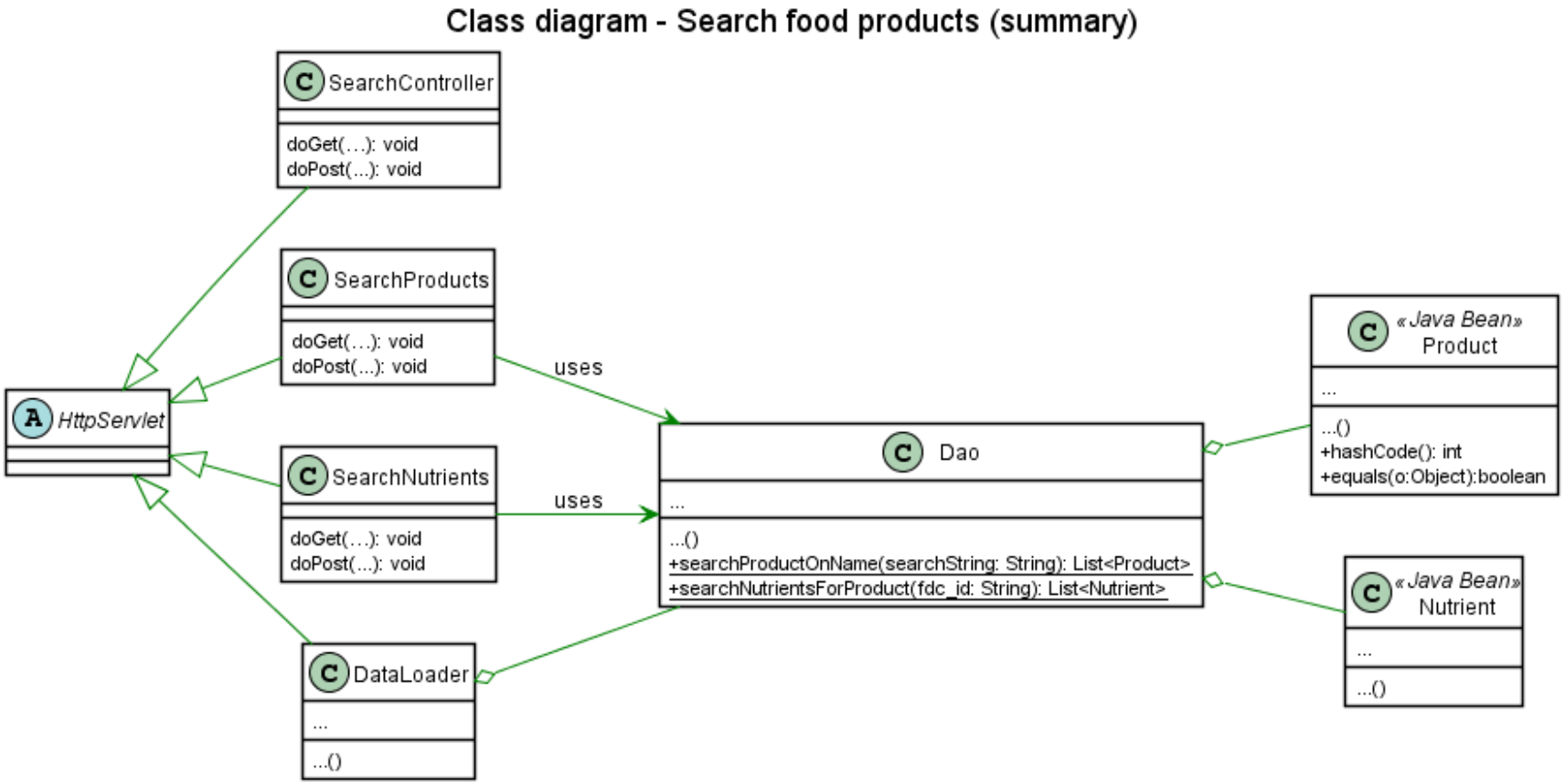

Figure 14: Class diagram - Search food product (summary)

Red30	Sprint 2 - Beta
Development Artifacts	Build Code

Data model

No change in model.

03. Build Code

No change in model.

04. Deliver and Deploy

No change in model.

05. Challenge 2

Implement Compare use case.

06. Solution 2

User story - Compare food products

As a user, I want to look up food products so that I can compare their nutritional values.

Red30	Sprint 2 - Beta
Development Artifacts	Solution 2

UI mockup - Compare food products

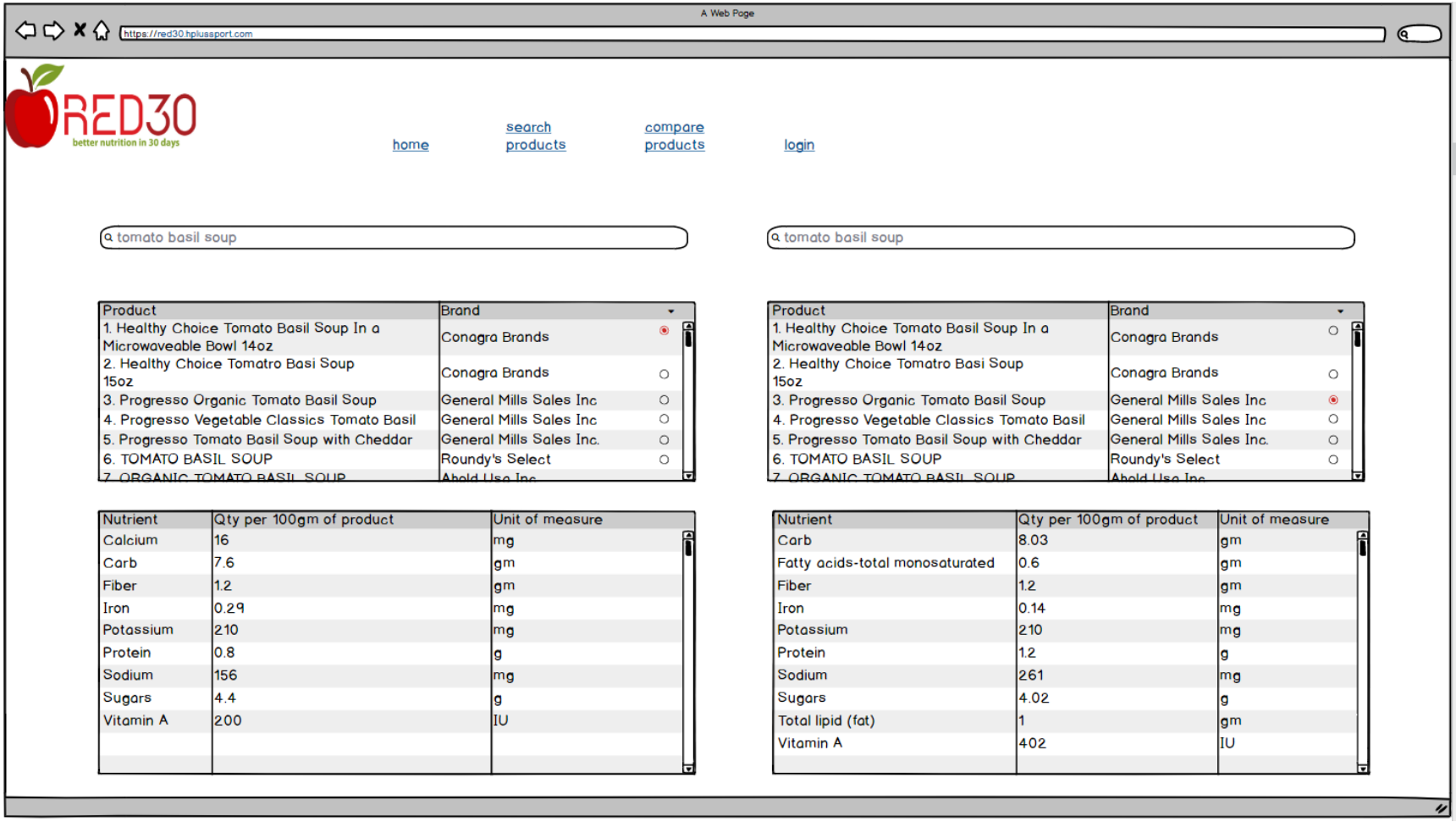

Figure 15: UI mockup - Compare food products

Red30	Sprint 2 - Beta
Development Artifacts	Solution 2

Sequence diagram - Compare food products

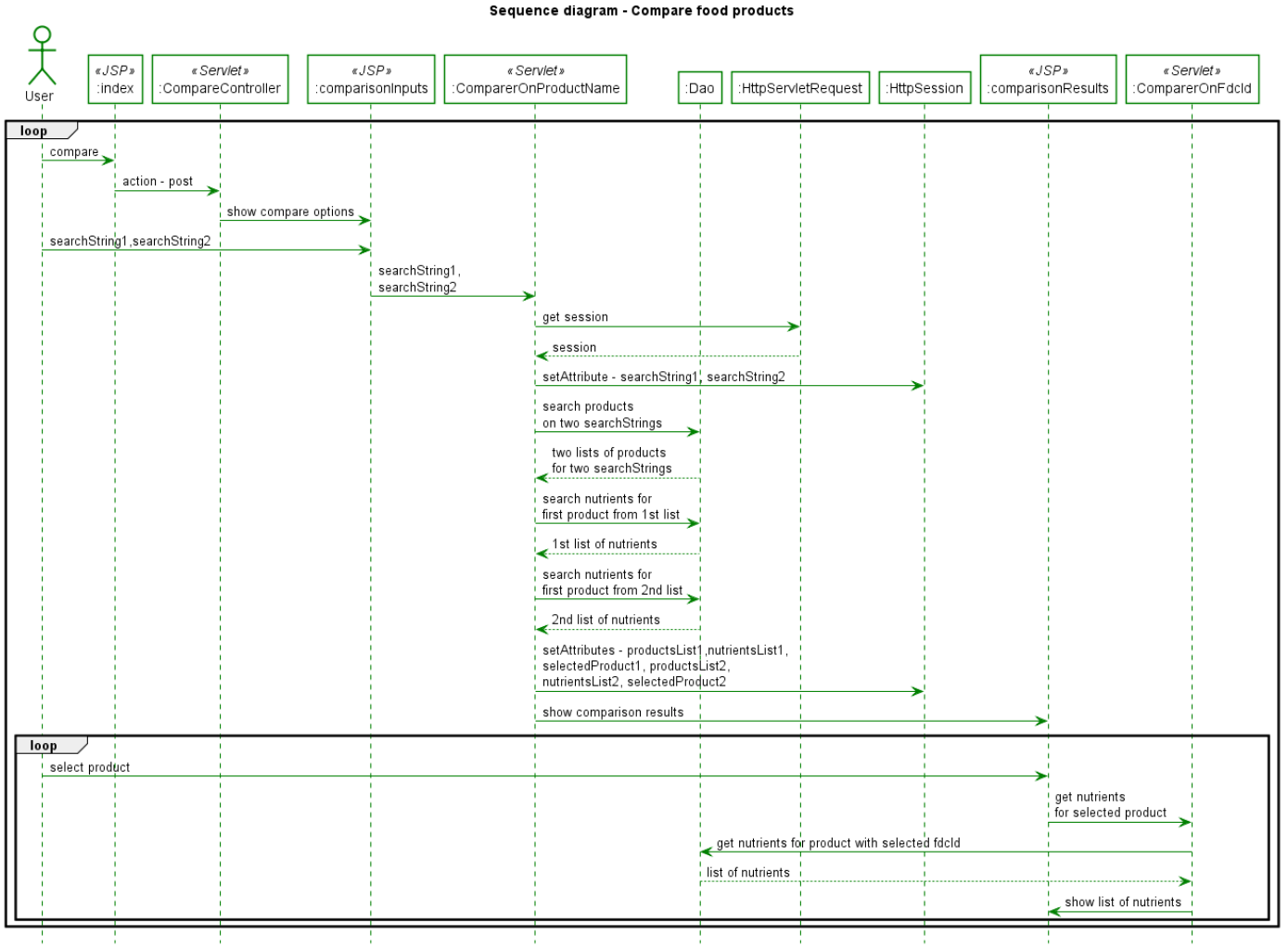

Figure 16: Sequence diagram - Compare food products

Class diagram - Compare food products

Class diagram -Detailed

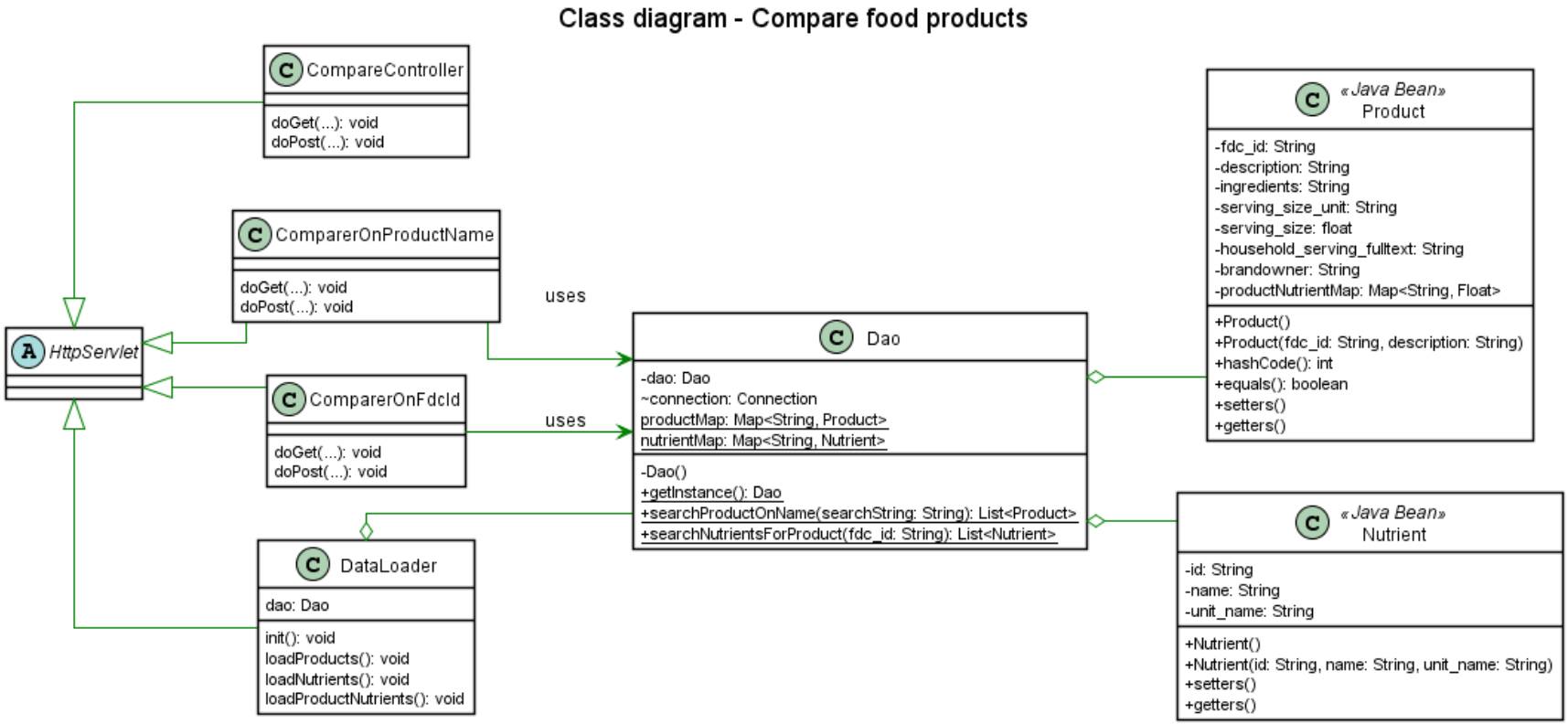

Figure 17: Class diagram - Compare food products (detailed)

Class diagram - Summary

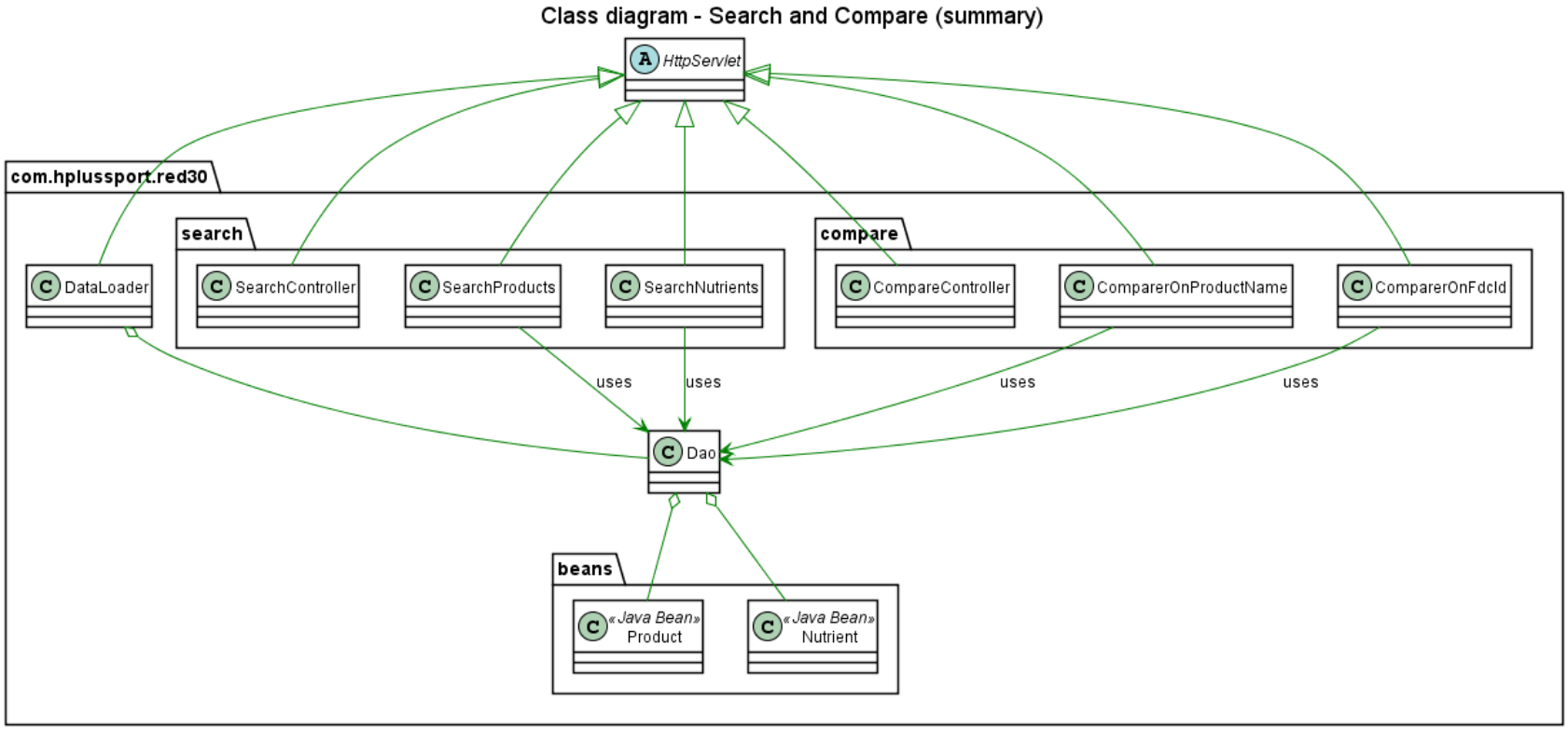

Figure 18: Class diagram - Full (summary)

Red30	Sprint 3 - Release 1.0
Development Artifacts	Prepare Sprint Backlog

Sprint 3 - Release 1.0

01. Prepare Sprint Backlog

User stories

User story: Record meal

As a registered user, I want to record my meals so that I can maintain my daily diet log.

User story: View diet log

As a registered user, I want to view my diet log so that I can keep track of what I am eating.

User story: Login

As a registered user, I want to log in to Red30 system so that I can use special features for registered users.

Use cases

Use case: Record meal

Primary actor: Registered user
Secondary actor: None
Description: In this use case, a registered user can record their meals.
Precondition: The registered user should be logged in.
Basic flow

1. Registered user chooses the option to record a meal.
2. Red30 provides options to enter meal data – meal date, time, and meal type (breakfast, lunch, dinner, or snack).
3. Registered user enters the required inputs.
4. Registered user searches for food product served in the meal by entering a search string.
5. Once found, registered user selects and enters quantity of serving and adds to the meal.
6. If more products were served, registered user goes back to step 4, unless they save the meal.
7. Red30 confirms that the meal has been saved.
8. Use case ends successfully.

Alternate flow

From step 3 of basic flow:

1. Registered user tries to save the meal without entering meal date or time.

2. Red30 displays a message that date and time must be entered.
3. Use case goes back to step 2.

Postcondition: Status of meal as saved or cancelled is displayed.

Use case: View diet log

Primary actor: Registered user
Secondary actor: None
Description: In this use case, a registered user can view their diet log.
Precondition: The registered user should be logged in.
Basic flow

1. Registered user chooses the option to view diet log.
2. Red30 displays the list of meals entered so far starting with most recent.
3. Red30 gives options to filter the list for a given date range.
4. Registered user enters the required inputs.
5. Red30 filters the list for a given date range.
6. Use case ends successfully.

Postcondition: Diet log is displayed.

Use case: Login

Primary actor: Registered user
Secondary actor: None
Description: In this use case, a registered user can log in to Red30 system.
Precondition: The registered user should have access to Red30 on the web.
Basic flow

1. Registered user chooses the option to log in.
2. Red30 displays the options to enter username and password.
3. Registered user enters username and password.
4. Red30 checks the username and password, and if correct, shows new features for registered users.
5. Use case ends successfully.

Alternate flow

1. From step 4 above, if the username and/or password are incorrect, Red30 displays a message and asks user to try logging in again.

Postcondition: Special features are available for use.

02. Implement Included Use Case

Use case - Login

UI mockup - Login

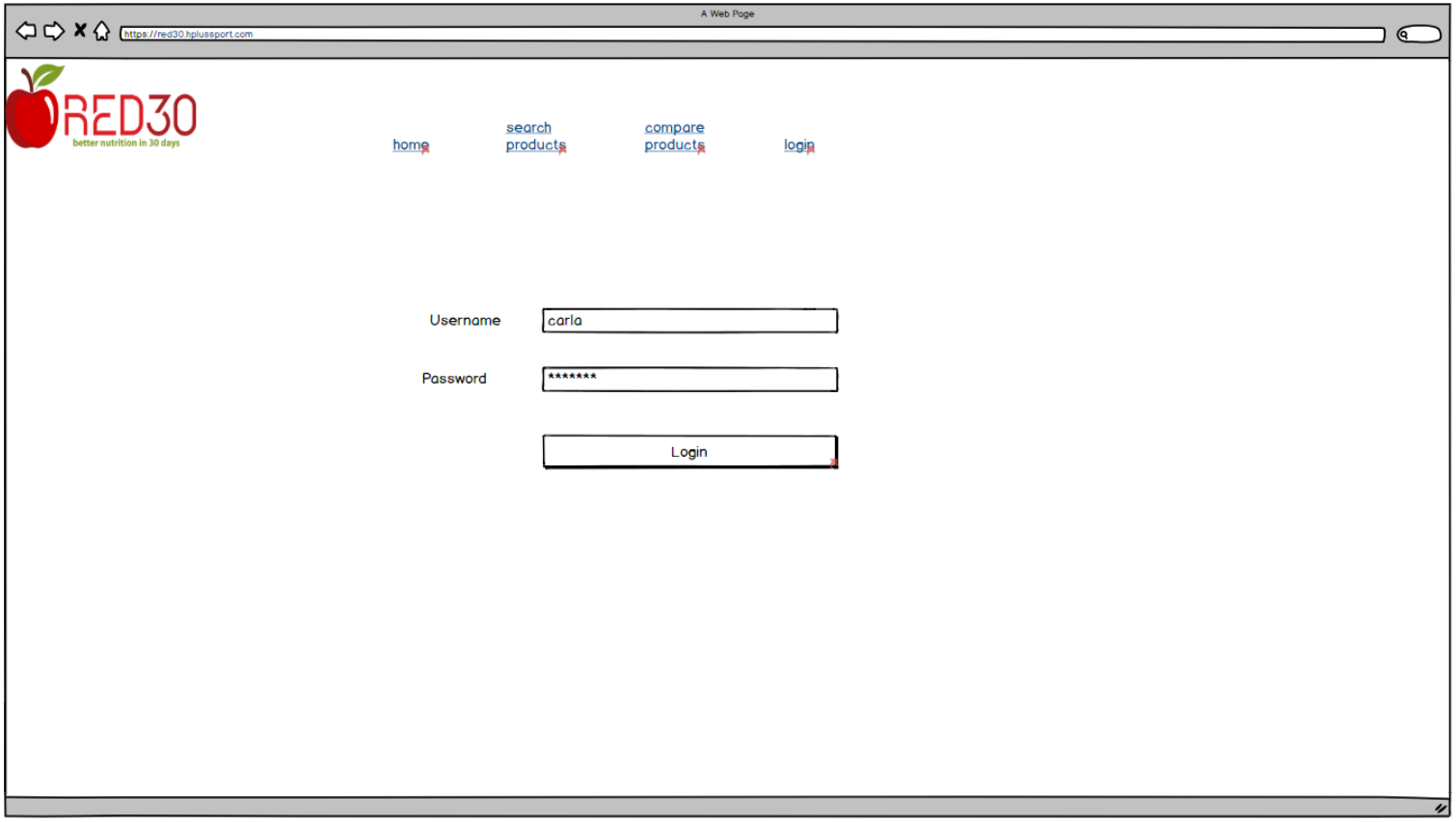

Figure 19: UI mockup - Login 1

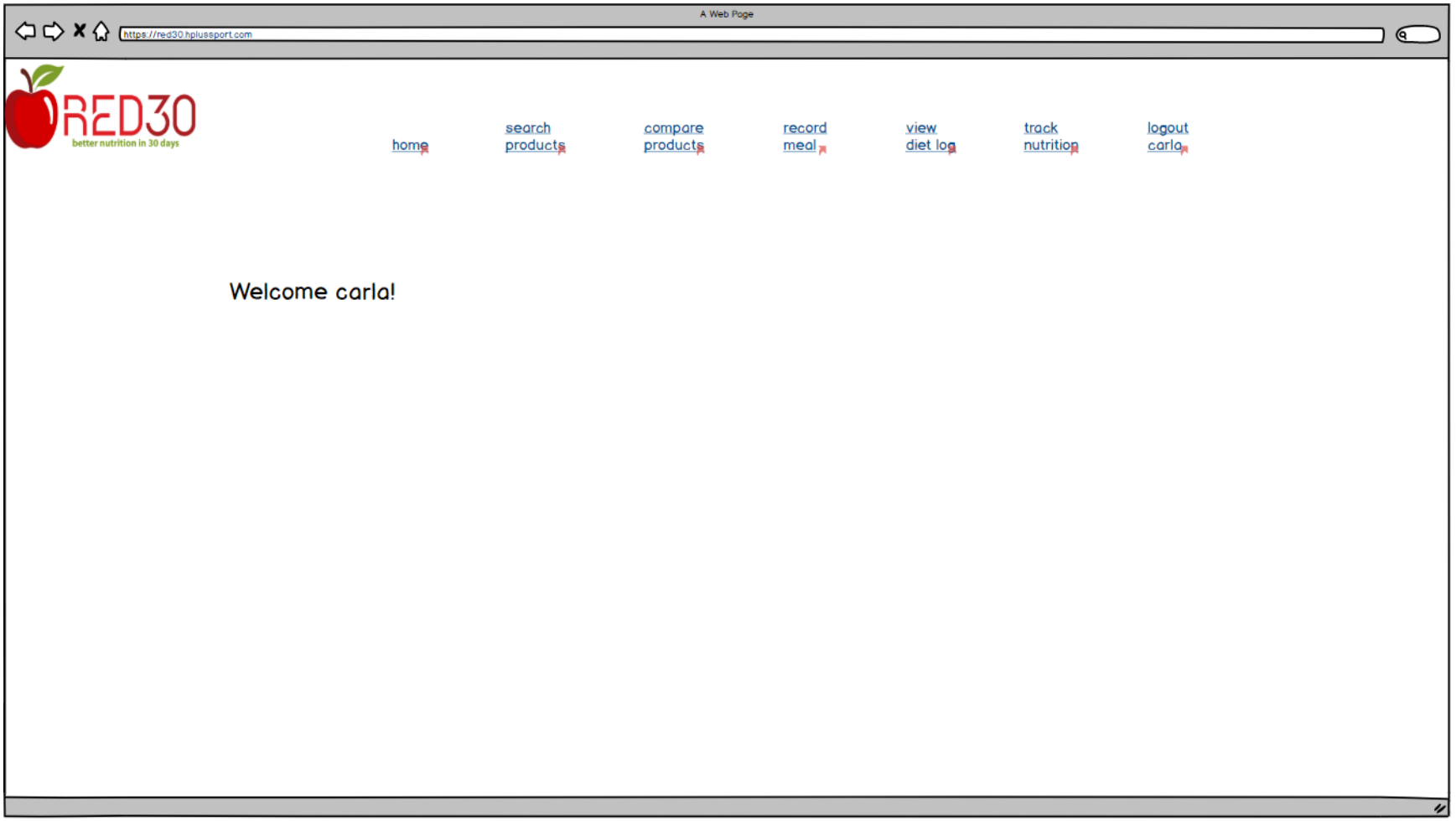

Figure 20: UI mockup - Login 2

Sequence diagram - Login

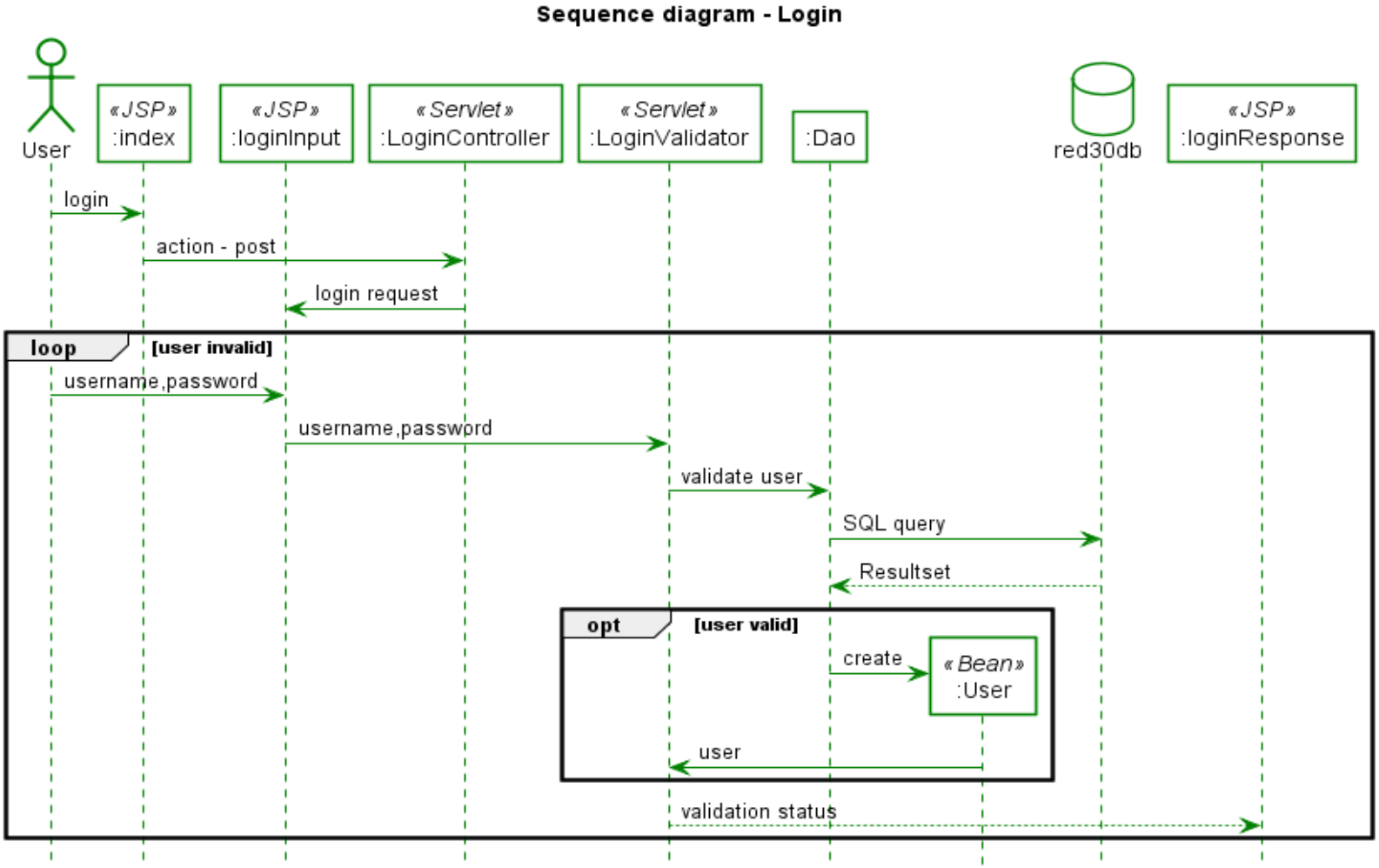

Figure 21: Sequence diagram - Login

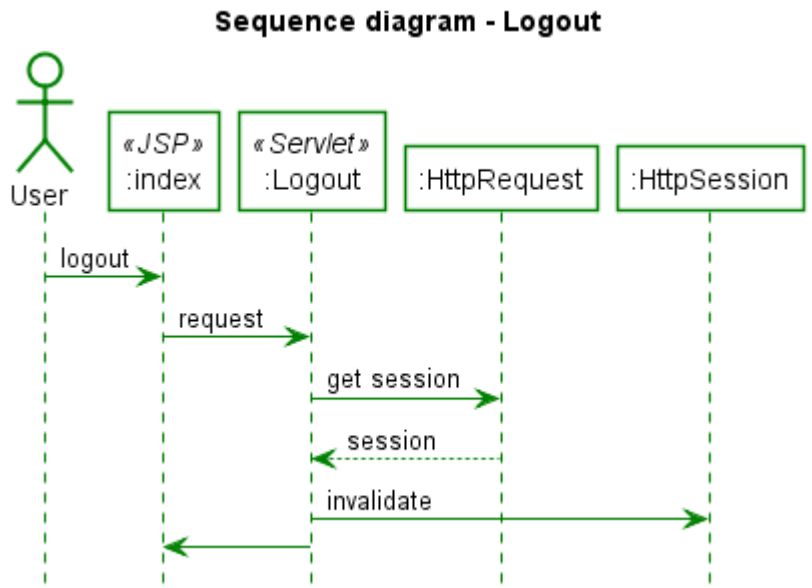

Figure 22: Sequence diagram - Logout

Class diagram - Login

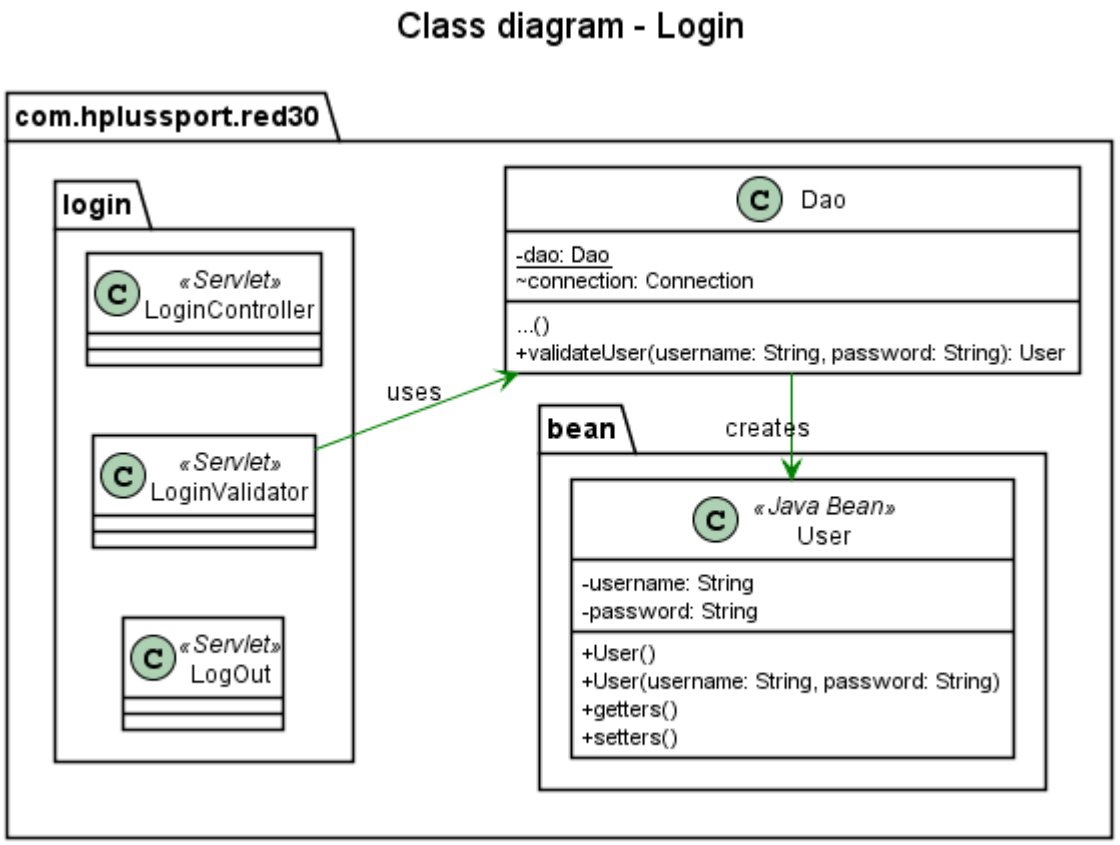

Figure 23: Class diagram - Login

Red30	Sprint 3 - Release 1.0
Development Artifacts	Implement Included Use Case

Data model - Login

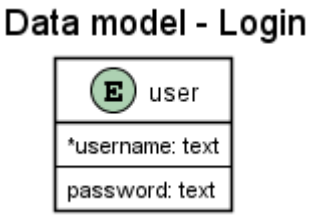

Figure 24: Data model - Login

SQL to create user table in red30db

```
CREATE TABLE `red30db`.`user` (
  `username` varchar(10) NOT NULL,
  `password` varchar(10) NOT NULL,
  PRIMARY KEY (`username`)
) ;
```

03. Final Release

Use case - Record meal

UI mockup - Record meal

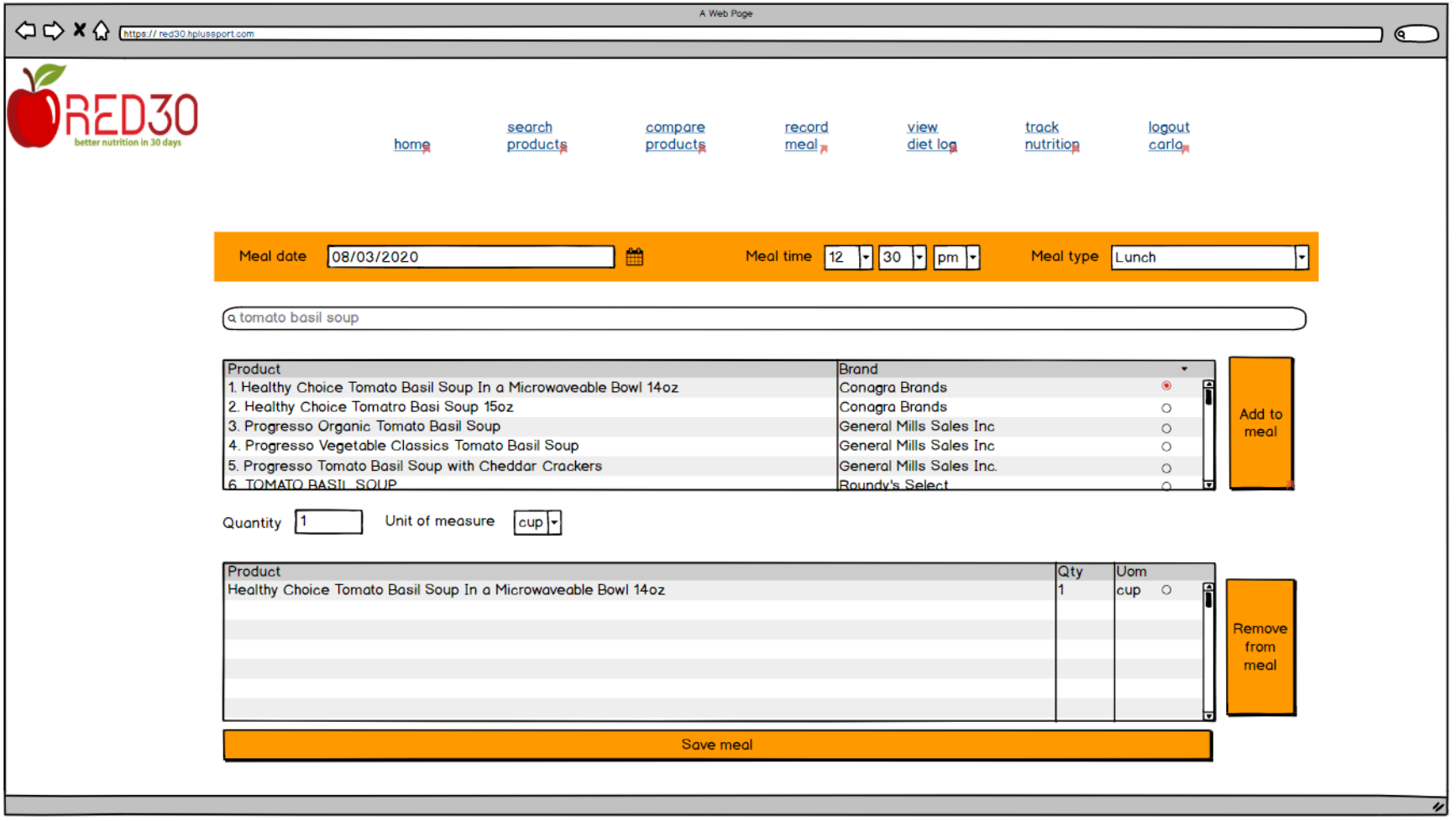

Figure 25: UI mockup - Record meal

Sequence diagram - Record meal

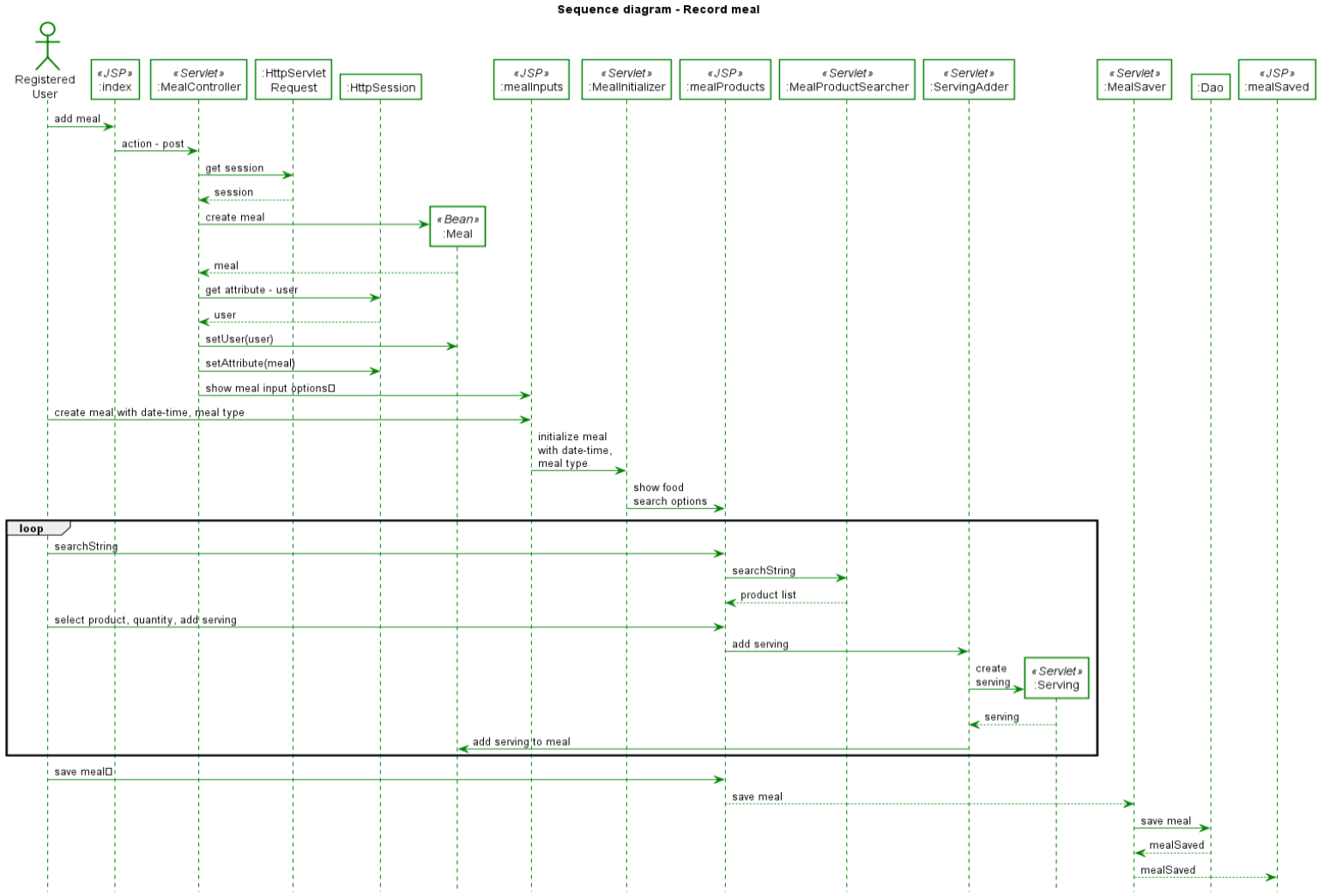

Figure 26: Sequence diagram - Record meal

Class/package diagram – Record meal

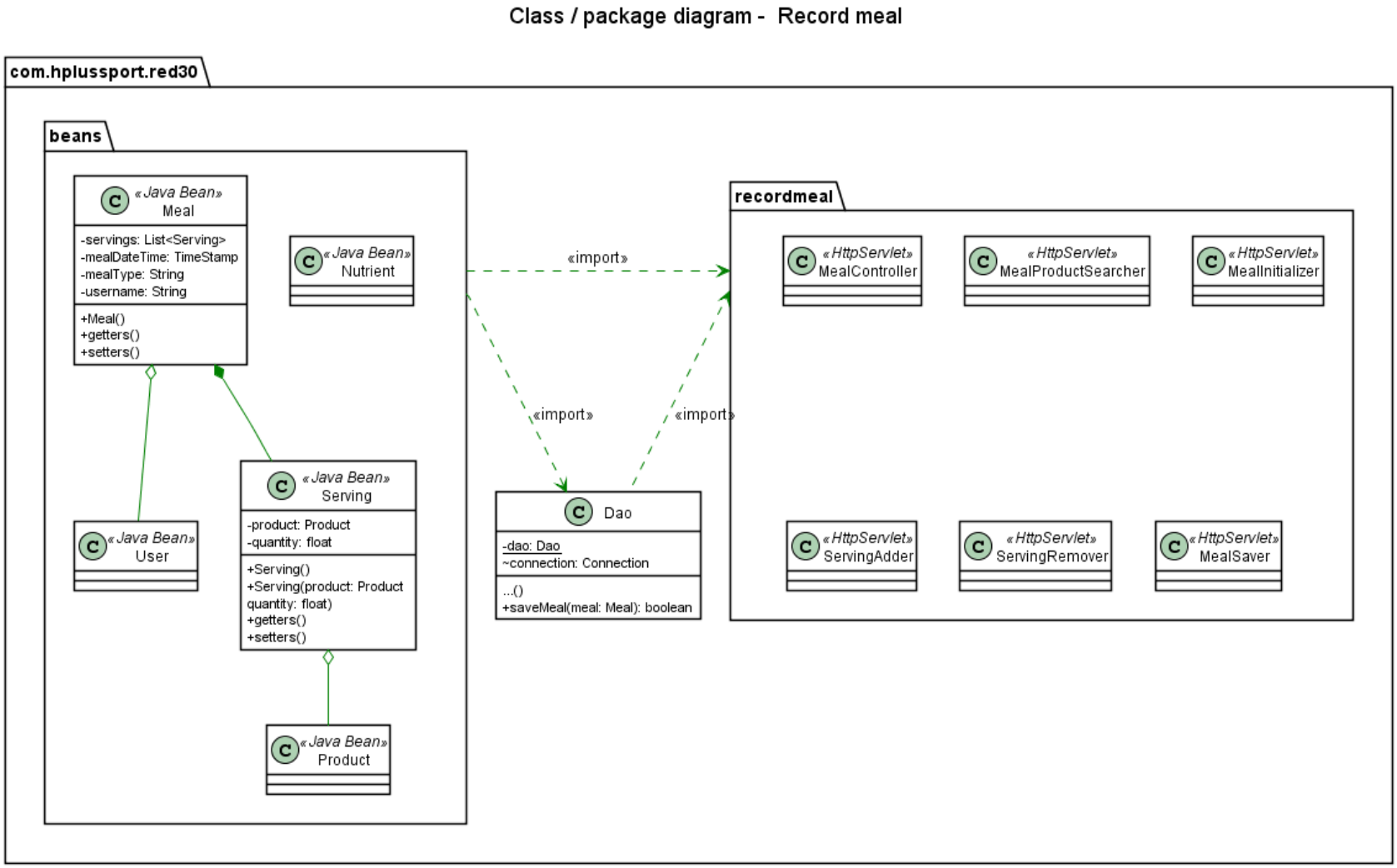

Figure 27: Class/package diagram - Record meal

Data model - Record meal

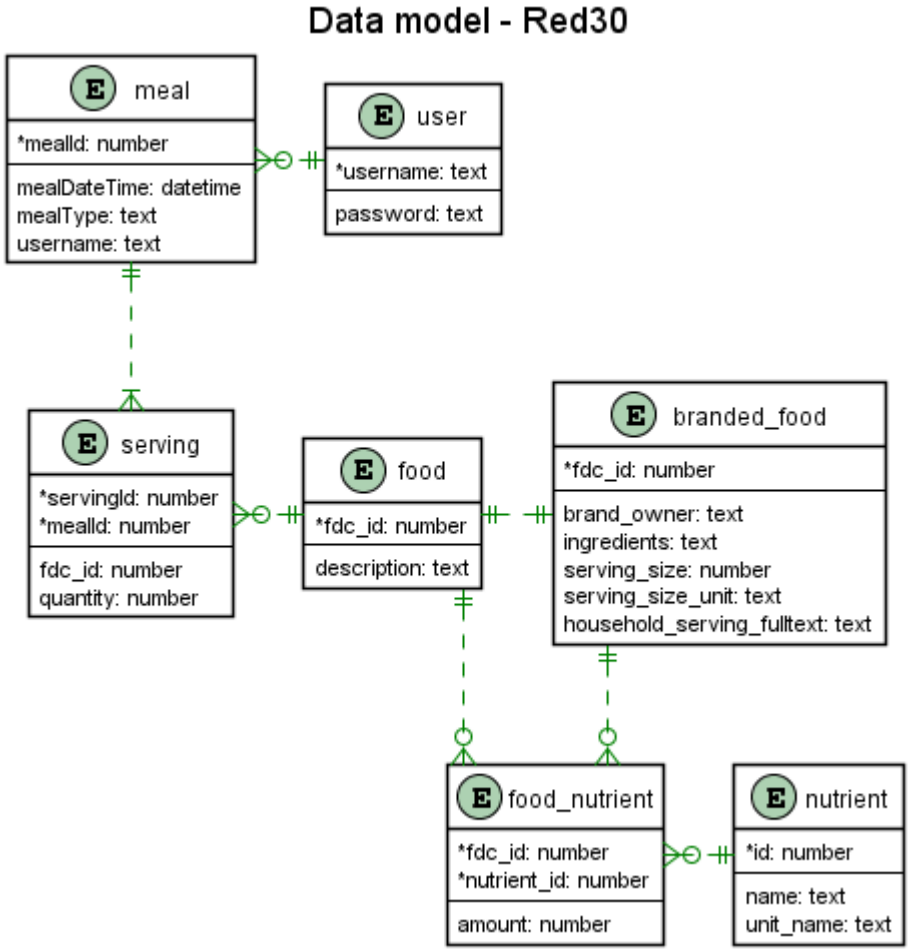

Figure 28: Data model - Record meal

Red30	Sprint 3 - Release 1.0
Development Artifacts	Final Release

SQL to create meal and serving tables

```
CREATE TABLE `red30db`.`meal` (
  `mealId` INT NOT NULL AUTO_INCREMENT,
  `mealDateTime` DATETIME NOT NULL,
  `mealType` VARCHAR(10) NULL,
  `username` VARCHAR(10) NOT NULL,
  PRIMARY KEY (`mealId`));
```

```
CREATE TABLE `red30db`.`serving` (
  `servingId` INT NOT NULL AUTO_INCREMENT,
  `mealId` INT NOT NULL,
  `fdc_id` INT NULL,
  `quantity` FLOAT NULL,
  PRIMARY KEY (`servingId`, `mealId`));
```

Use case - View diet log

UI mockup - View diet log

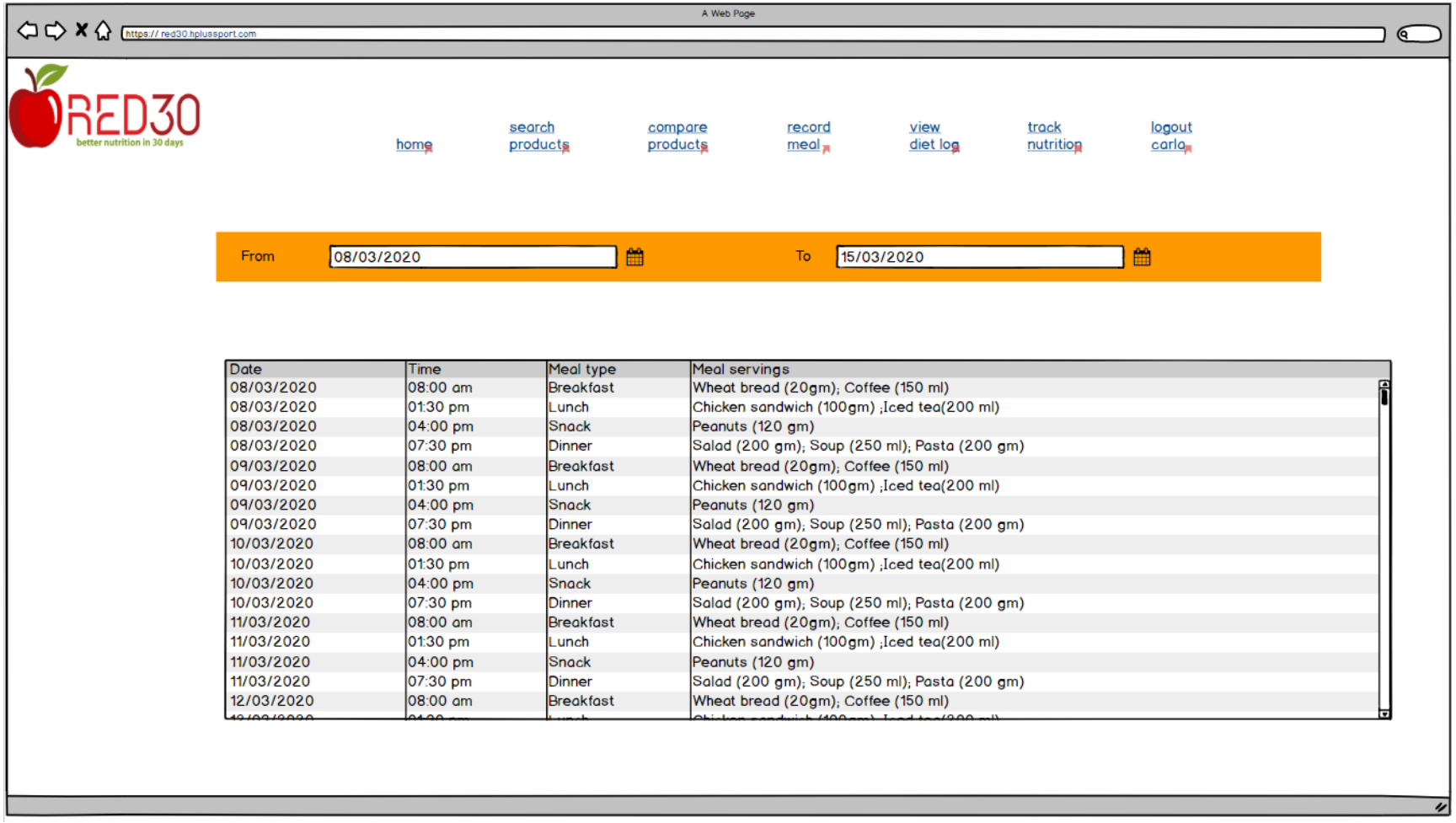

Figure 29: UI mockup - View diet log

Sequence diagram - View diet log

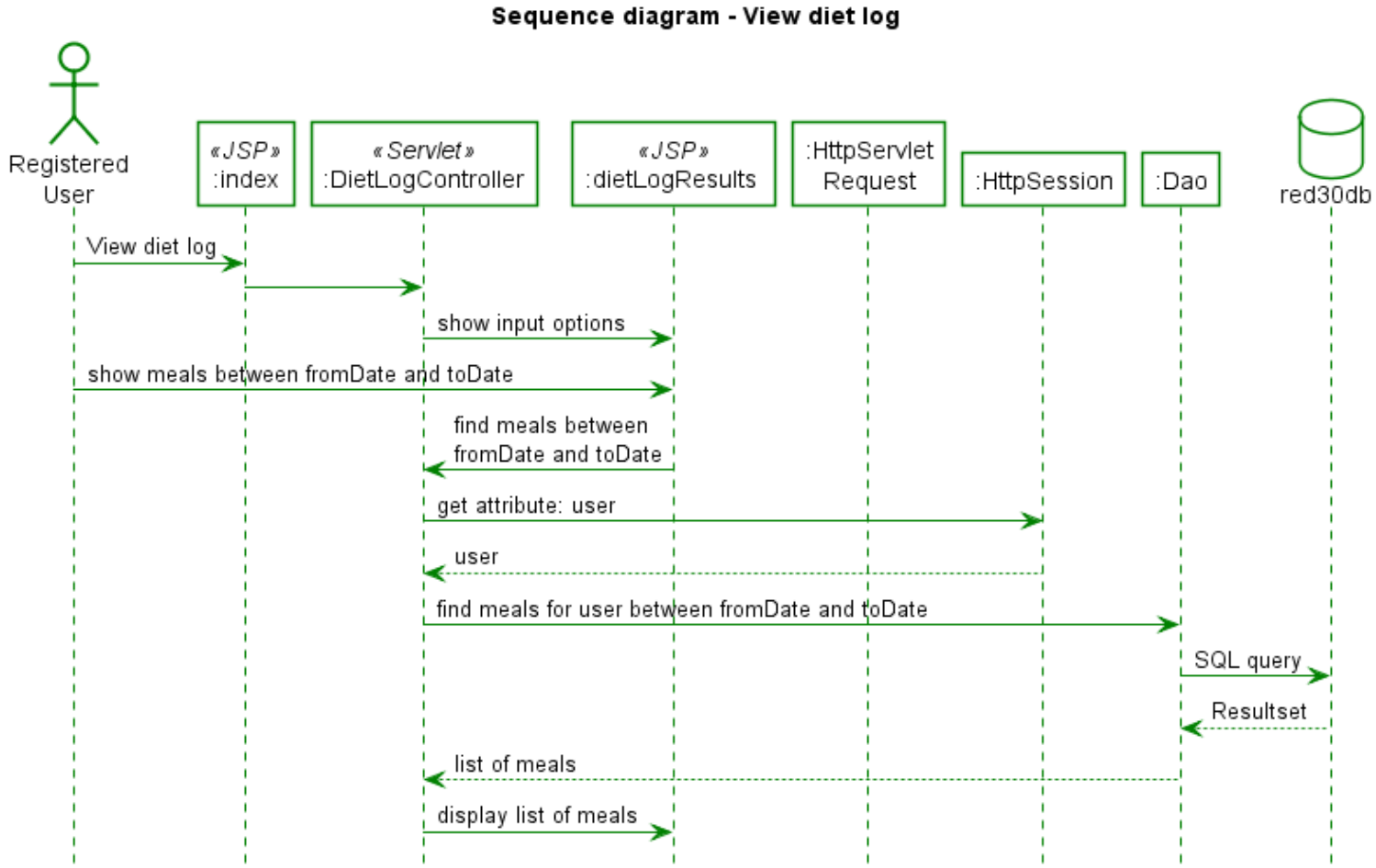

Figure 30: Sequence diagram - View diet log

Class diagram - View diet log

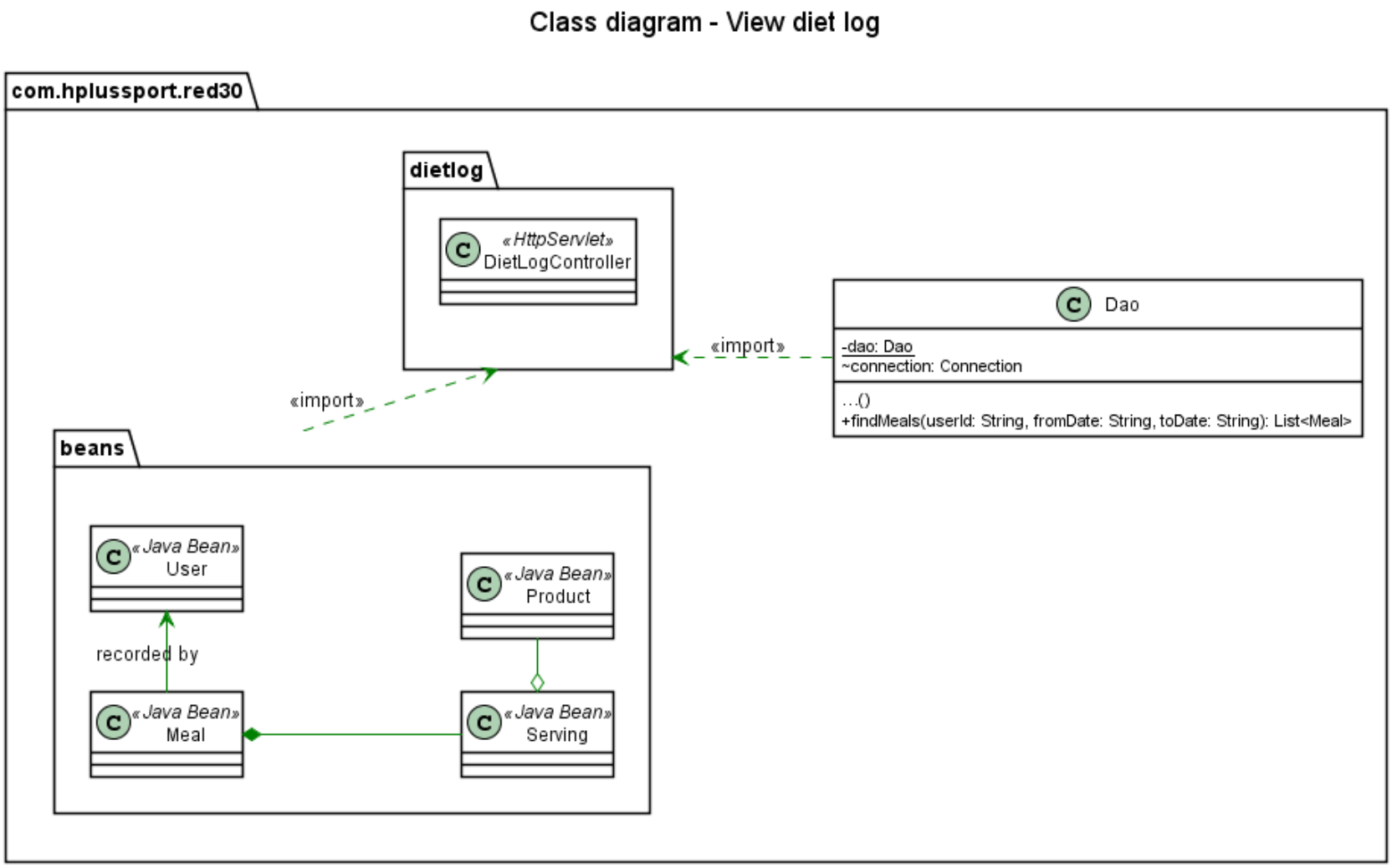

Figure 31: Class diagram - View diet log

Data model

No change

04. Refactoring

Refactored data layer

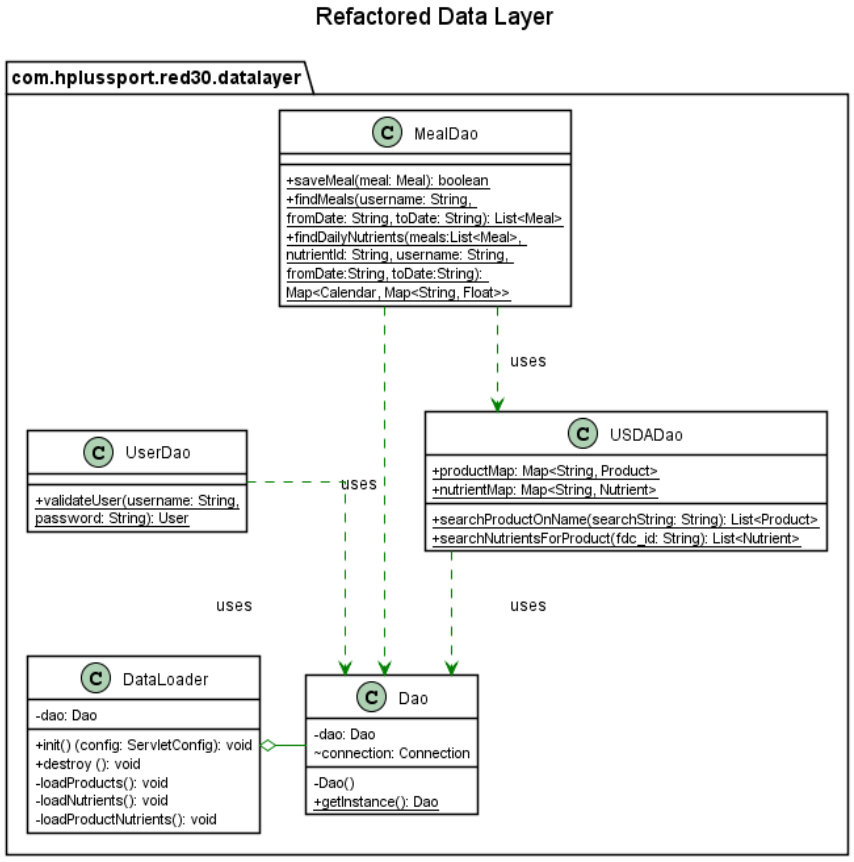

Figure 32: Refactored data layer

Refactored class diagram

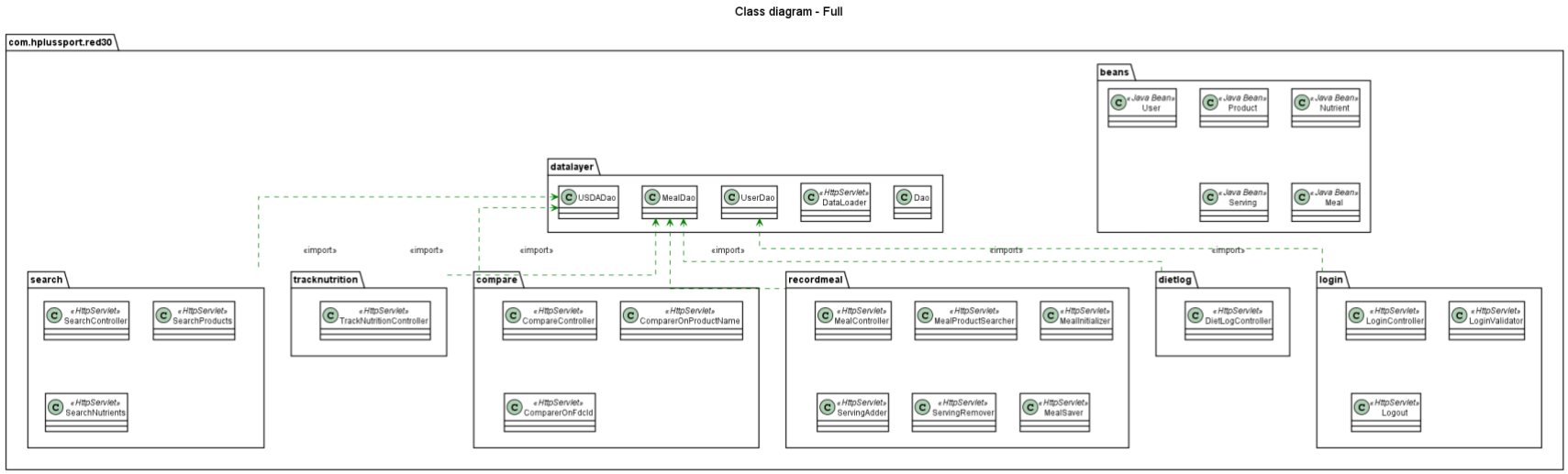

Figure 33: Refactored class diagram

05. Challenge 3

1. Implement Track Nutrition use case.
2. Refactor data layer.

06. Solution 3

UI mockup - Track nutrition

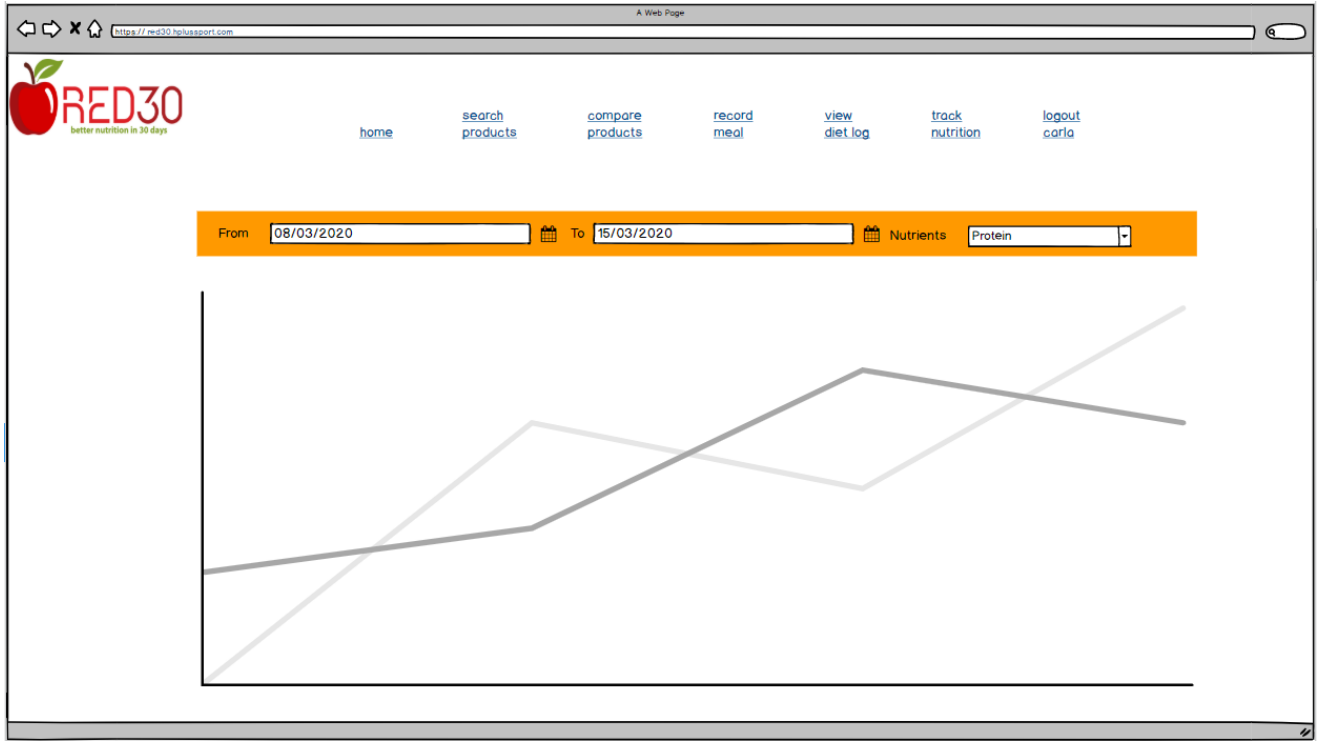

Figure 34: UI mockup - Track nutrition

Sequence diagram - Track nutrition

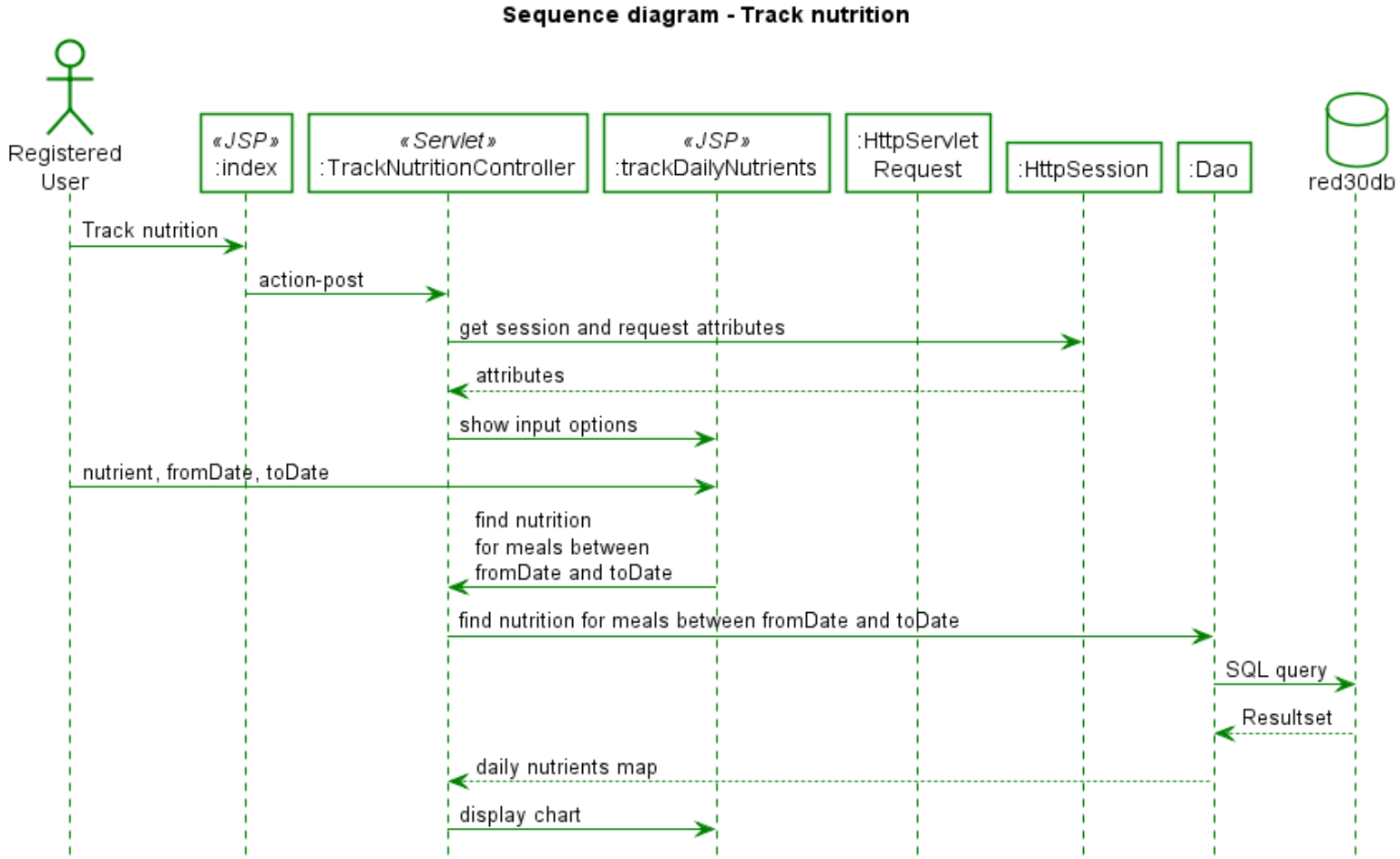

Figure 35: Sequence diagram - Track nutrition

Class diagram - Track nutrition

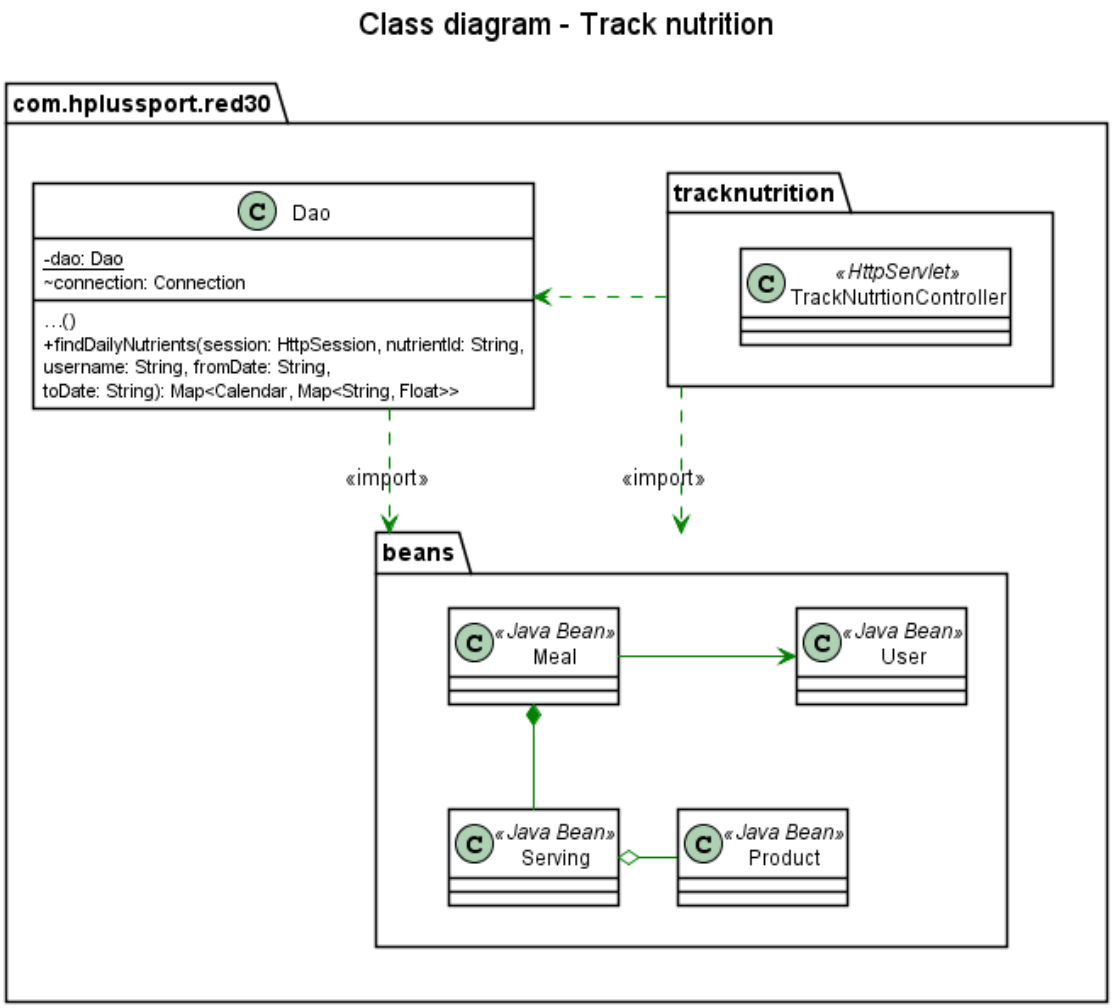

Figure 36: Class diagram - Track nutrition

Appendix

01. Glossary

#	Term	Definition
1.	Coach	A person who works for H+ Sport company as a professional health coach
2.	Diet log	A list of meals showing their servings of products and its quantity in each meal with date, time, and meal type
3.	IT admin	An H+ Sport employee who is responsible for managing a Red30 application
4.	Meal	An entry made by a registered user that has date, time, meal type, and a list of food products with their quantities
5.	Meal type	Meal types – breakfast, lunch, dinner, or snack
6.	Member	An H+ Sport customer who is registered for Diet Consulting Services with H+ Sport
7.	Nutrient	Nutritional element contained in food products
8.	Product	A food product as provided in USDA's FoodData Central
9.	User	Any user using a Red30 application
10.	Registered user	User who has been registered with H+ Sport as a coach, member, or IT personnel; registered user has a valid username and password to get access to some functionalities in Red30
11.	Serving	A product served in a meal