TQS: Product specification report

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1 Introduction

1.1 Overview of the project

With this project, we aimed not just to create a viable MVP of a product, but also to follow a complete, professional, workflow (including, but not limited to, the use of project management tools, the automation of CI/CD and code quality standards).

To do this, we decided to develop Apollo Care, a website and mobile app combo that facilitates the scheduling and management of consultations for both clinic workers and patients alike.

1.2 Limitations

As our product is still in the MVP phase, there are still planned features we have yet to implement. These features are:

- Staff page.

- Consultation queues (for demo purposes, this has been temporarily mocked using a service that randomly generates consultations).
- Notification system for the user page.
- Role-based access restrictions using RLS (so that patients can´t access other patient´s data).
- Designing a separate workflow for staff and doctor registration to enforce the above restrictions (some proposals were requiring manual registration directly in Supabase or to be added manually by another staff member/doctor).
- Show available timeslots for the selected area.
- Optimizing query time by caching/indexing frequently used results.

2 Product concept and requirements

2.1 Vision statement

ApolloCare is mainly divided into 3 groups:

First, the app and website allow the patient to schedule new consultations as well as showing available timeslots for the selected area. However, we do not force the patients to use the app, as the staff themselves can schedule the consultations.

Secondly, we also allow the patient to see both future and past consultations and allow the user to set notifications, allowing users to not lose track of them.

Finally, we also integrate the call screen/consultation queue functionality into our app, automating the process of choosing and displaying the next people to be received.

2.2 Personas and scenarios

Persona Example: Ana, Marketing Manager

- **Name**: Ana Cardoso
- **Age**: 34
- **Occupation**: Marketing Manager
- **Background**: Ana is a busy professional who values efficiency and convenience. She often juggles multiple responsibilities at work and home.
- **Goals**: Ana wants to manage her health without disrupting her work schedule. She prefers using digital tools to book and track her medical appointments.
- **Pain Points**: Ana finds it challenging to remember her appointments and dislikes long wait times at the clinic.

Scenario: Ana Scheduling a Consultation

Morning Routine Ana checks her phone over breakfast to review her day's schedule. She realizes she needs to book a follow-up consultation with her doctor.

Using Apollo Care Ana opens the Apollo Care app, logs in, and navigates to "Schedule". She selects her preferred clinic and doctor, views the available timeslots, and books an appointment for the upcoming week.

At the Clinic Ana arrives at the clinic, checks in using the app, and waits for her name to appear on the call screen, indicating it's her turn for the consultation.

Conclusion This scenario demonstrates how easy and convenient it can be, for busy people like Ana, to schedule an appointment at Apollo Care.

Scenario: Ana Checking Future Appointments

Afternoon Break at Work During her afternoon break at work, Ana remembers that she has a follow-up appointment with her doctor coming up but cannot recall the exact date and time.

Using Apollo Care Ana opens the Apollo Care app on her phone. She logs in and navigates to the "My Appointments" section, which displays a list of her upcoming and past consultations.

Reviewing Future Appointments In the "Appointments" section, Ana sees her scheduled follow-up consultation for next Wednesday at 2:30 PM.

Conclusion This scenario demonstrates how Apollo Care can help users like Ana to manage their medical appointments efficiently.

2.3 Project epics and priorities

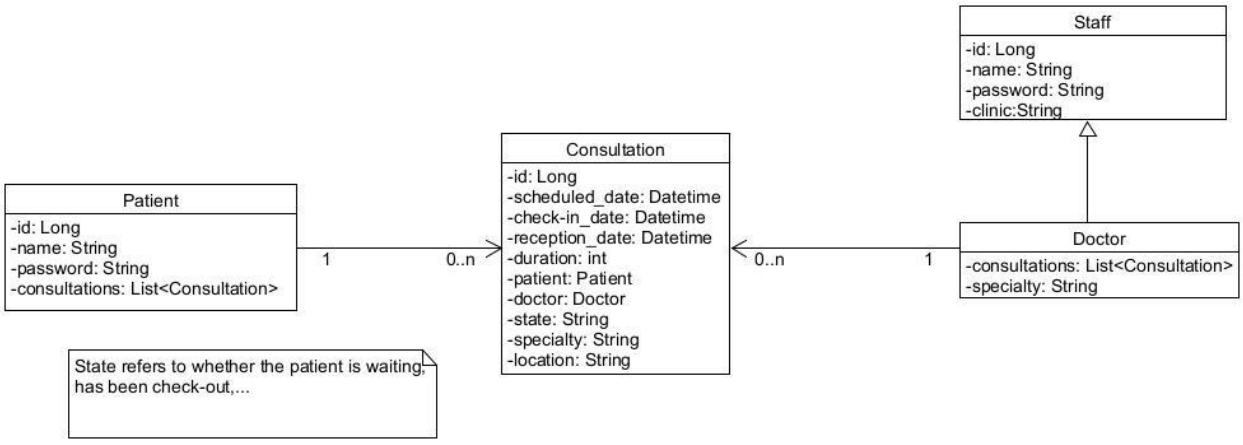
Besides the 2 sprints dedicated to the conception phase, we had a total of 3 sprints (including the current one).

The objective of the first sprint was to setup the groundwork. Our goals (besides setting up Sonarcloud and Jira) were to set up the frontend, setting up authentication, setting up Supabase and its tables (and streamlining its connection by creating a “JPA-like” abstraction) and setting up base scheduling functionalities (as future functionalities were dependent on most of these features), as well as the call screen integration (as it wasn´t dependent on anything and we wanted to get it done as soon as possible). As this was the first sprint developing actual code, we were a bit overeager and ended up having to extend the sprint for 2 more days but, overall, we were satisfied with the results given the available time.

For the second sprint, rather than try to do as many functionalities as possible, we focused on expanding the existing functionalities by displaying future/past consultations, as well as adding check-in functionality and setting up CD. As we managed to meet our deadlines, we are satisfied with the results.

For the third sprint, as it is the last week available, we are focusing on generating/writing documentation, as well as doing integration and load tests in order to test the ApolloCare as a whole (as we previously only had the opportunity to unit test specific components in isolation).

3 Domain model



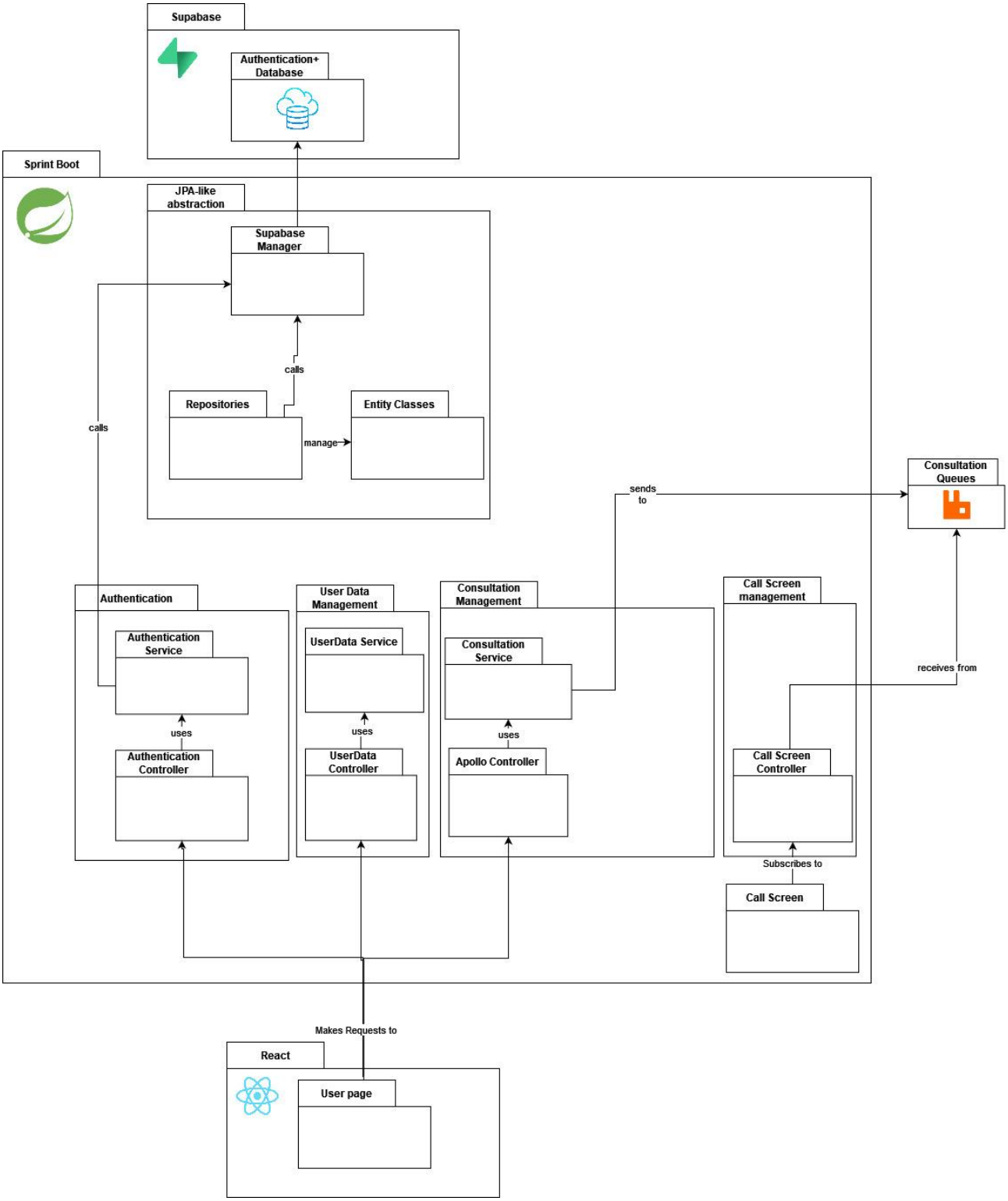
4 Architecture notebook

4.1 Key requirements and constrains

The following constraints had an impact on the choice of architecture:

- The call screen must dynamically display new information in less than 2 minutes -> Call screen is updated using web sockets.
- The user page must be separate from the remaining system (to allow the latter to scale independently) and, if possible, must be available in Android -> React was chosen for the frontend.
- The queue system must be decentralized to allow each clinic to run (and scale) its own queues, if desired. -> Queues are made using RabbitMQ (rather than just use a Java queue).
- While each clinic's queues may be separated, the authentication and storage features must be shared between all clinics using the system. -> Database and authentication use Supabase (as it is an external service, it can be shared even if running multiple server instances).
- Using Supabase (because it is an external service) prevents the use of JPA and there's no (official) Java client. -> Create a class to streamline the REST request (by pre-setting repetitive values). Use repository classes to abstract the interaction with Supabase while providing a "JPA-like" interface for ease of use.

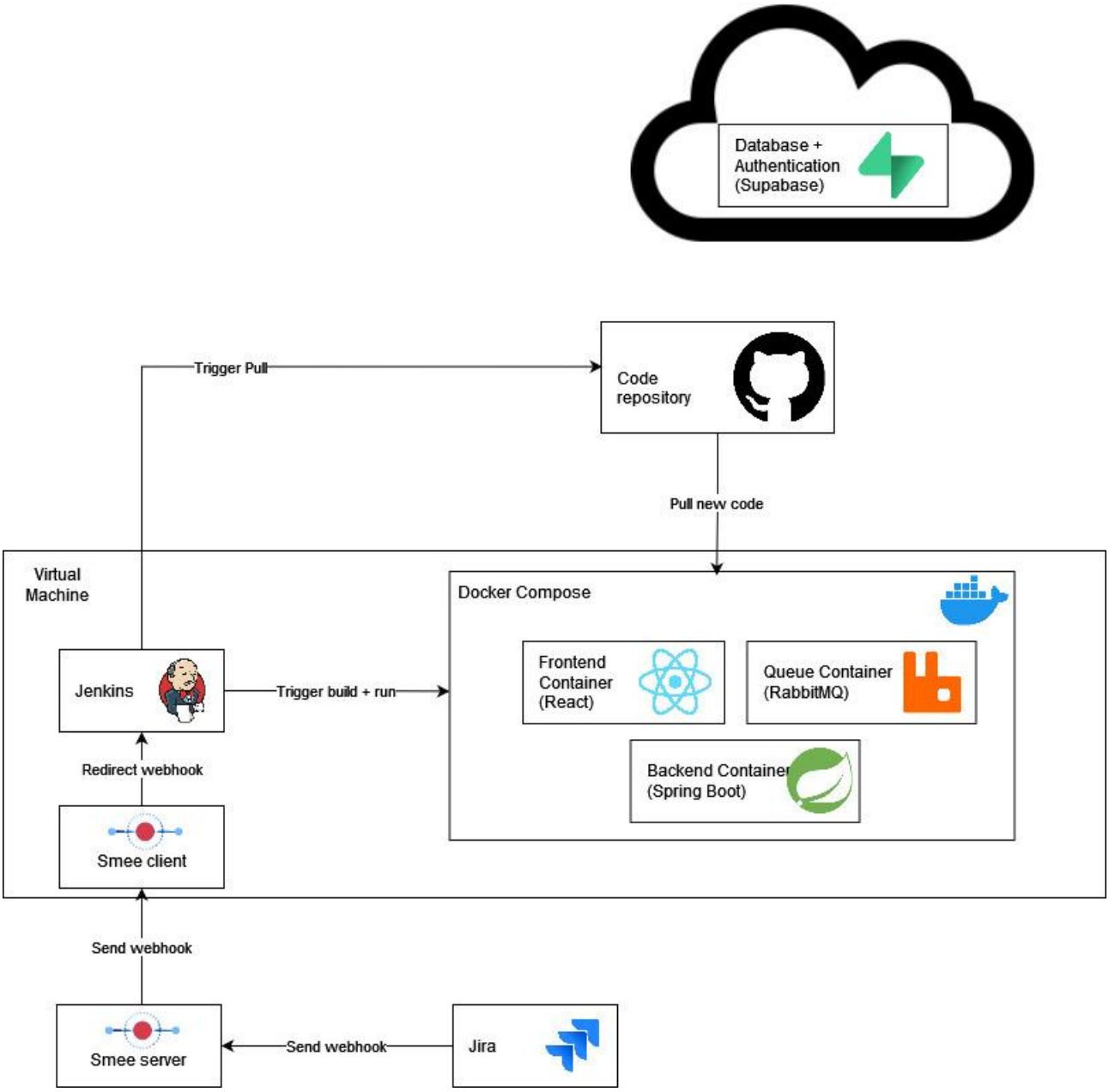
4.2 Architecture view



Note: for better readability, only some interactions between modules are represented in the diagram. For the full list of interactions, please consult the table below.

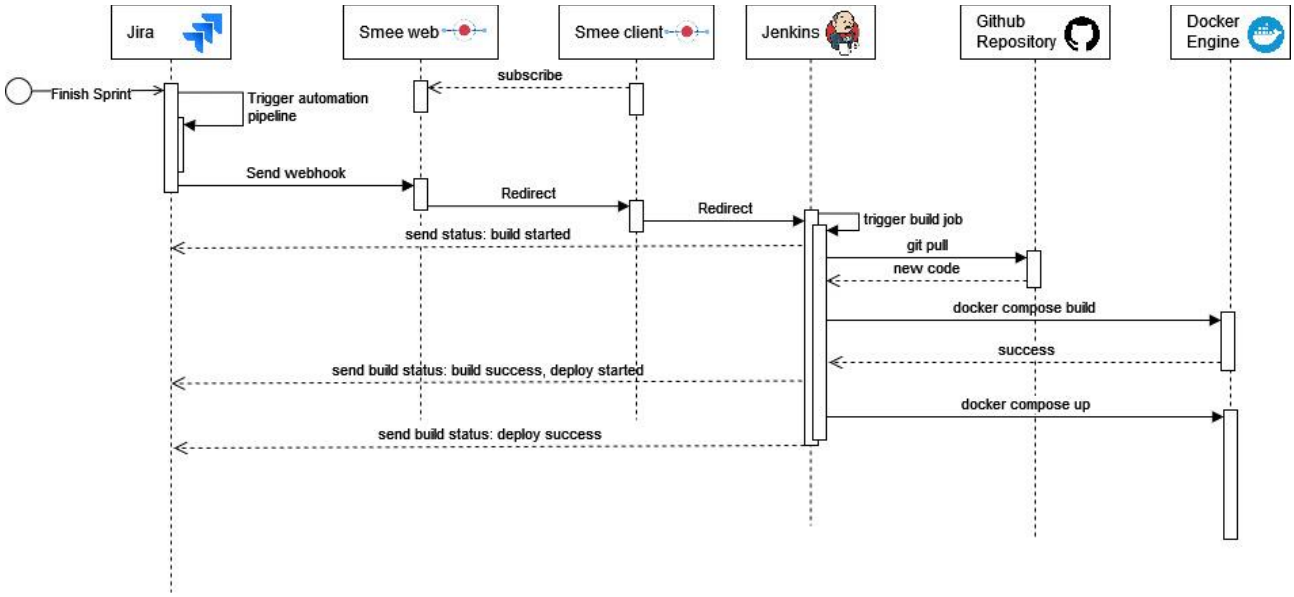
Component name	Technology used	Purpose	Main interactions with other modules	
			Interacts with	Reason
User page	React (Ionic)	Interface for the user (patient) to use	Authentication, User Data and Apollo Controllers	Gets/Posts data
Call Screen	Spring Boot	Displays recently called consultations	Call Screen Controller	Subscribes to in order to receive updates
Authentication Service + Controller	Spring Boot	Registers and logs in the user	Supabase Manager	Calls to use Supabase's auth functionalities
			User Repository	Inserts new user on register, fetches on login.
User Data Service + Controller	Sprint Boot	Fetches user details (consultation history, for example).	Consultation Repository	Fetches consultations by patient and state (SCHEDULED or CHECKED_OUT)
Apollo Controller + Consultation Controller	Sprint Boot	Deals with consultation-related operations (schedule, check-in…)	Consultation Repository	Fetches/inserts consultations
			Consultation queues	Adds checked in consultation
Call Screen Controller	Spring Boot	API for the call screen to subscribe to	Consultation queues	Subscribes to be notified when a new consultation is called
Consultation Queues	Rabbit MQ	Queues that set call order of consultations (one per clinic per area of specialty)		
Entity classes	Sprint Boot	Each class represents a table in the database (made to mirror @Entity classes in JPA).		
Repositories	Spring Boot	Provide functions to perform database operations (made to mirror @Repository classes in JPA).	Entity classes	Each repository has a corresponding entity they insert/fetch from the database
Supabase Manager	Spring Boot	Wrapper from Spring's WebClient class. Streamlines request sending and response processing.	Supabase	Mediates requests to Supabase.

4.3 Deployment architecture



Note: the use of smee is used to “bypass” the firewall restrictions on inbound connection by having the client subscribe to the server (turning an inbound connection to an outbound connection). Supabase exists in the cloud and doesn’t require any actions during deployment.

4.3.1 Deployment architecture



5 API for developers

The api follows the following format:

- Endpoints related to authentication need to use the prefix "/auth/{versão}"
- Other endpoints must use the prefix "/api/{versão}"
- Urls that don't follow these prefixes will, in a future version, be redirected to the frontend.
- Endpoints that belong in the same category as "logic" must have the same prefix (for example, endpoints related to user data must be prefixed with "/api/{versão}/user"

Documentation can be found here, Swagger.

6 References and resources

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Introduction to Spring REST Docs | Baeldung. (n.d.). Retrieved June 2, 2024, from https://www.baeldung.com/spring-rest-docs
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