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TQS: Product specification report

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1 Introduction

1.1 Overview of the project

This project has the objective to implement a multi-layered, enterprise web application with a *Software Quality Assurance* (SQA) strategy, applied throughout the software engineering process.

The project incorporates a digital marketplace to offer on-demand household services (plumber, cleaner, furniture assembly, handyman, etc.), with the nearest independent service professionals.

The main platform, called **WeDo4U**, manages a dynamic workforce of service professionals; accepts orders; optimizes the assignment of jobs to the professionals; and allows scheduled visits. It will have separated areas for the professionals to input the services provided and times, and for the consumers to use the platform and order or schedule a service.

It will includes two main “sub-projects”:

a) The **deliveries platform** (“engine”), with use cases such as professionals registration and reputation management, dynamic matchmaking of orders and home services, performance dashboard, etc.

b) A **specific application** /market proposition, called **Plumber.com**, that leverages on the deliveries platform. In our specific case, it hosts all the plumbing services that the Business *Plumber.com* and its staff are able to provide to whoever wishes to contract a plumbing service.

1.2 Limitations

- Implementation of the generic management platform in a mobile platform

2 Product concept

2.1 Vision statement

Our system is meant to be used as an easy, readily available means of managing generic service providers, with the ability to be extended to any type of service - from household errands to financial planning guidance or even childcare providers.

In addition to getting a recognized professional service provider, the system includes a rating and evaluation mechanism that allows the user to analyze the various alternatives to its problem.

Aside from that, it enables secure communication between the customer and the expert, allowing them to discuss the details of the service or offer updates on its whereabouts.

Every user that interacts with the systems (the WeDo4U management platform and the Plumber.com user-facing platform), such as a Business, a Provider, or a Client, is given an APIKey that allows access to the platform. Without it, HTTP-Request Errors will be raised, therefore safeguarding the established system.

2.2 Personas

Jordan is a 57-year-old entrepreneur, one of the founders and currently a CEO of *'Handyman Home Repair'*. He is married with two children and enjoys spending his spare time with them.

He finds himself frequently very busy, with little or no spare time, due to the rapid surge in demand for minor home repairs over the last few months.

In order to preserve HHR's positive business image and grant him more free time, Jordan sought out a software solution that would include the service delivered and the specialist hired, encouraging consumers to give brief feedback about the service rendered. What he didn't realize was that the number of possible software solutions was very limited, and the learning curve was steep.

He has tried a few different business-management-oriented software-concepts over the last few months, but none have fulfilled his needs and, in the end, have given him much more work.

MOTIVATION: Jordan wants to keep closer track of his company's results, allowing recurring and newer customers to easily hire a competent service provider.

Bob is a 33-year-old general plumber who has been employed as a freelancer in Bobsville since the start of his career. He is single and has a German Shepard that he enjoys hiking with on the local trails.

He is a perfectionist, trustworthy, and very effective in his service delivery, supplying clients with a very competent job while adhering to a stringent set of guidelines in order to maintain his integrity and attract more satisfied customers.

Even though he has a handful of loyal clients, Bob wishes to extend his modest network and provide his high-quality service to those looking for plumbing workers. This can be a time-consuming task, as he must distribute his ads while still keeping track of the compliments and positive criticism he receives.

He attempted to register himself on many online freelancing sites, but was not successful because it required too much of a learning process.

MOTIVATION: Bob would like to keep track of his customer reviews and become more involved in the market in order to reach out to potential clients.

Wendy is a 30-year-old electrician who has been working at *'Handyman Home Repair'* for the last two years. She is single and really enjoys working at that company, being recognized for her good work.

As the director of the *Electricity-Services-Department*, she is responsible for ensuring that all services delivered are of the same high standard, so as not to jeopardize the positive feedback she has received.

Despite the fact that she has a steady position at the firm, Wendy wishes to keep better track of her current customers. This job is inconvenient because the program used at HHR is very old and the data is stored in an inconvenient way.

She tried to make her own spreadsheets, but she soon abandoned the thought because it involved learning how to function effectively with a modern, unknown software tool.

MOTIVATION: Wendy would like to view her client's data in a more organized and easy way, as well as being able to update it easily.

Kate is a 57-year-old woman, she is a well-known psychologist and now she consults her patients online from her home. She lives by herself, she has one son and one daughter but they both live already moved out.

Now that she spends more time at home she has a weekly schedule for household tasks so she can keep the house clean and tidy as she likes.

But nowadays, with the pandemic, she has got more and more patients and her days are getting really busy with work and she lacks time to accomplish the house taks.

Kate really needs to find a trustworthy company to contract the services she needs to keep her house clean, tidy and with all eventual problems fixed.

MOTIVATION: Kate will need to contract a service to accomplish the tasks at her home as she can~~ do it all by herself anymore, and also this morning she noticed a leak in her bathroom while showering and she needs to find a reliable plumber to do the job of fixing the leak.

2.3 Main scenarios

There are two main scenarios for the end-users, one for the independent service professionals and service companies to include the services they provide and their time availability and also to get notification for the requested appointments, and another for the clients to visualize and schedule a household service they require and to schedule an appointment with one of the professionals.

Scenario 1:

Bob inserts his services in the platform *— Bob opens the application and sees a welcome message which informs him about the key features of the application. After registering to the platform, and also informing the area he can make his visits, Bob explores the features that allow him to insert the menu of services he provides and the times he is available to provide his services. He is also able to check when there is any new appointment made for his services.*

Scenario 2:

Kate requests a service on the platform *— Kate has a leak in her bathroom and needs the assistance of a plumber to fix the problem. Kate accesses the platform and finds the service she needs to contract. First of all Kate creates an account to register her address and payment method. Kate logs in to be able to request the service, and finds available plumbing services she needs, and she requires it on the platform. The platform assigns Bob to provide the plumber services, as he is an available professional and close to her area. Kate gets the confirmation of the appointment then waits for the professional at her house. Bob then receives the order for the home visit to provide his services.*

After the service is provided:

Acknowledging the provision of the service on the platform *— Kate received Bob's visit at her home to provide the plumbing service. Bob registers in the platform any extra service provided to fix the leak and allows Kate to acknowledge that the service was properly provided. Kate goes on the platform and informs that the service was finalized which allows the payment to be made. Bob receives the payment through the platform.*

2.4 Project epics and priorities

It follows below a diagram with the initiative and the epics of this project.

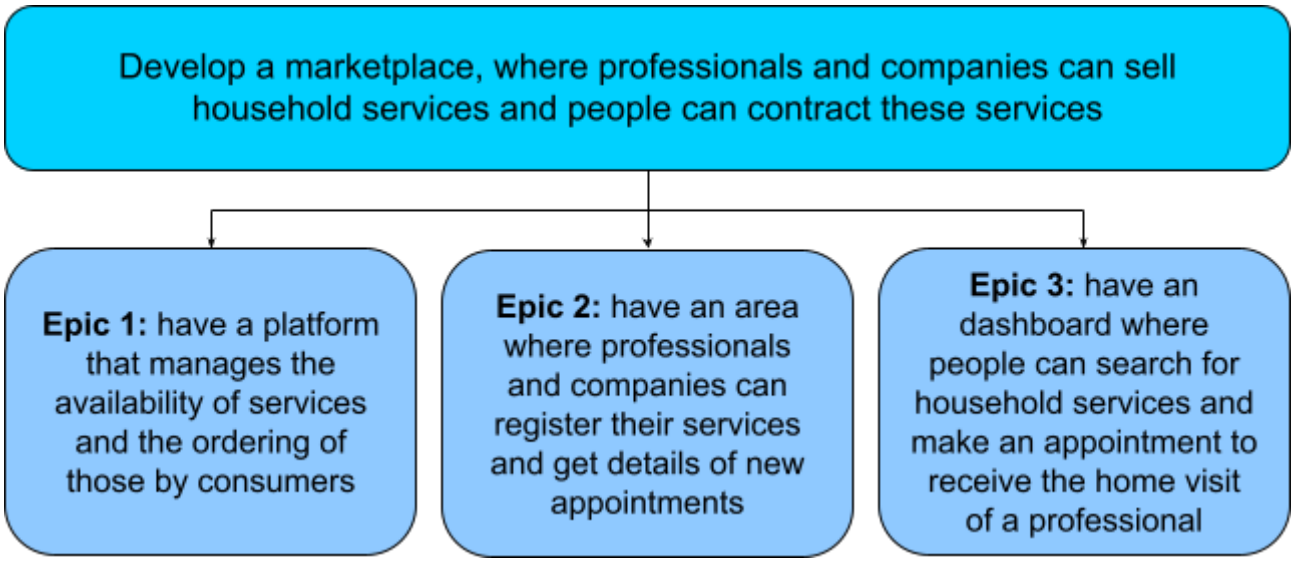


Figure 1 - Expected Project Epics

Below, the plan for the incremental implementation of the solution over the scheduled iterations, with the main functionalities to be reached by each epic.

Iterac-tions	Epic 1	Epic 2	Epic 3
I1 25/05	- Set up a template with a static view of the platform	- Set up a template with a static view of the area for the independent professionals and companies	- Set up a template with a static view of the dashboard for the customers
I2 01/06	- Initial setup of the backend: ● SpringBoot project and main classes; ● Persistence (persistence); ● REST API; - Initial implementation of the core stories; - Implementation of unit tests for the core stories implemented;		
I3 08/06	- A few core stories detailed and implemented; - QA tests implemented; - CI Pipeline;		
I4 15/06	- Product increment with a couple of core user stories: search + buy/order; - Comprehensive API; - Set up the CD pipeline; - QA tests; - Comprehensive REST API.		
I5 22/06	- Stabilized product (MVP); - CD Pipeline: services deployed to containers (or cloud); - Quality dashboard and gates; - Minimal Viable Product (MVP) backend deployed in the server (or cloud); - Documentation final version (Product specification report and QA report).		

3 Domain model

The model is composed by a generic user, that is parent of the users Client, Provider and Business. The users Provider and Business, they provide the services and are related to the Service. A Client can choose a service offered from a list, and hire services it's choice, so all users are related to the class Service Contract.

All users must have a location registered so the match can be made between the contractor and the client that is hiring the service, and the users Provider and Business also inform their availability as the working hours, so the match can be made more efficiently.

The image that follows presents the domain model diagram.

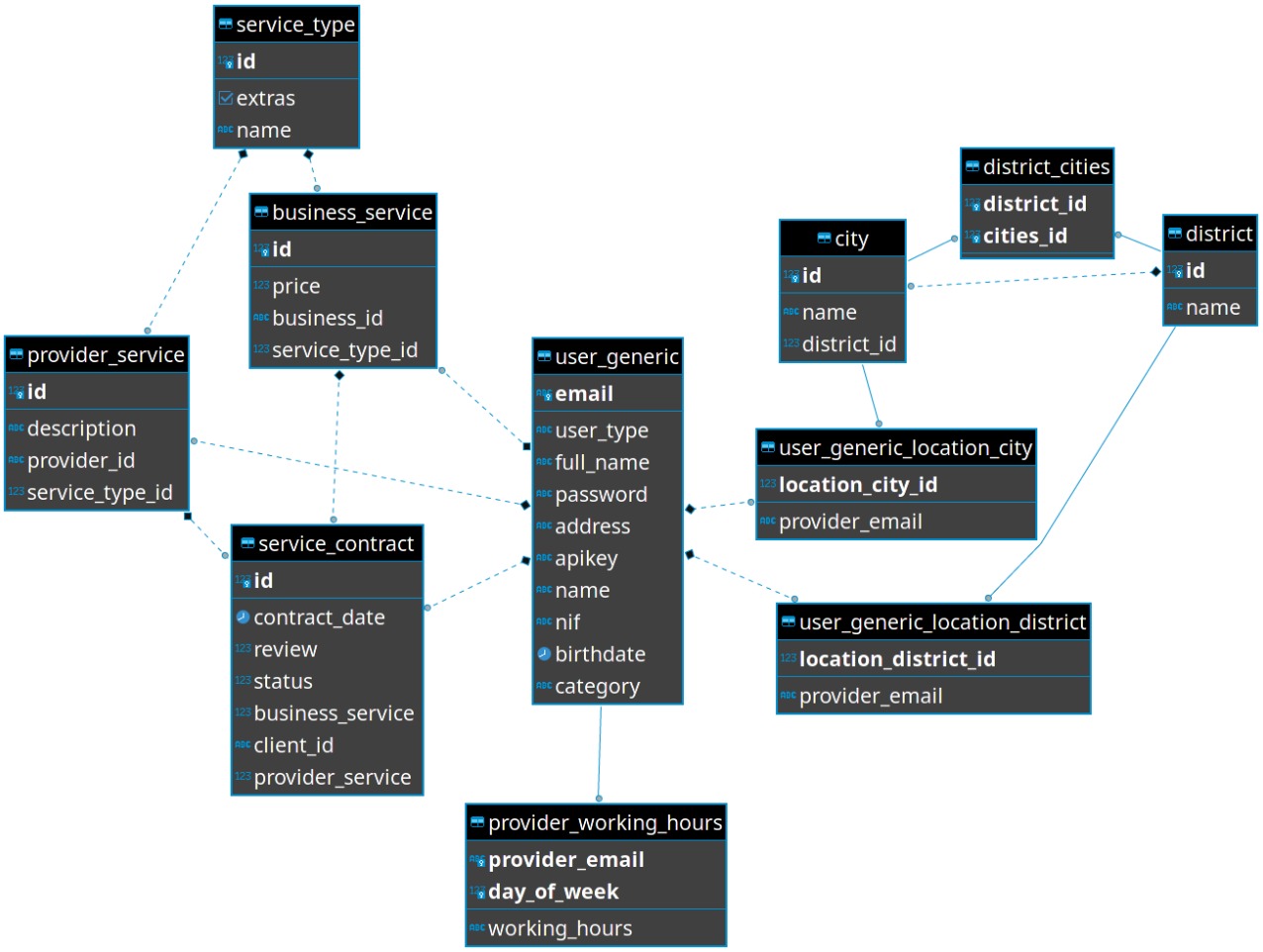


Figure 2 - Domain model

4 Architecture notebook

4.1 Key requirements and constraints

- The users should be able to access the Web-App from remote PCs or Mobile Devices with internet connection.
- The service providers need to register on the platform, in order to access it. This includes providing personal information, such as an email address, password, full name, birth date, gender and services offered. This information will be stored in the database.
- The clients need to register on the platform, in order to access it and be able to hire a service. This includes providing personal information, such as an email address, password, full name, birth date, gender and billing information. This information will be stored on the database.
- The Web-App should be continuously available.
- A Service Provider should have access to his past clients' reviews, organized in various charts, as well as his next employer information.

- When a client leaves a negative review (two stars or lower), the associated service provider should receive a notification about this update within 1 minute.
- The Web-App should be protected with authentication and authorization, meaning that each Service Provider only has access to his assigned clients, as well as each client can only chat with his assigned Provider.

4.2 Architectural view

The general architecture of the project is mainly composed of three parts: the backend layer, the client side layer (for the end-user and the providers) and the database layer.

Both backend layers (generic management system, WeDo4U, and the specific app itself, Plumber.com, that uses the WeDo4U API) were developed using Spring Boot with Spring Security, being able to communicate with the client side through Web sockets (for notifications when a new service is requested).

Similar to the backend layers, the two frontend platforms (WeDo4U, regarding Businesses and Providers, and Plumber.com) were developed in Angular, and communicate through the API to obtain the necessary information.

The database was developed in PostgreSQL, in order to be able to store the necessary information.

A Plumber.com user will interact with the web-interface to request a Service, made available by the Business and that is sent to the WeDo4U REST API. A Provider that is able to do that job will receive a notification on its interface (WeDo4U managing) and is able to accept the job.

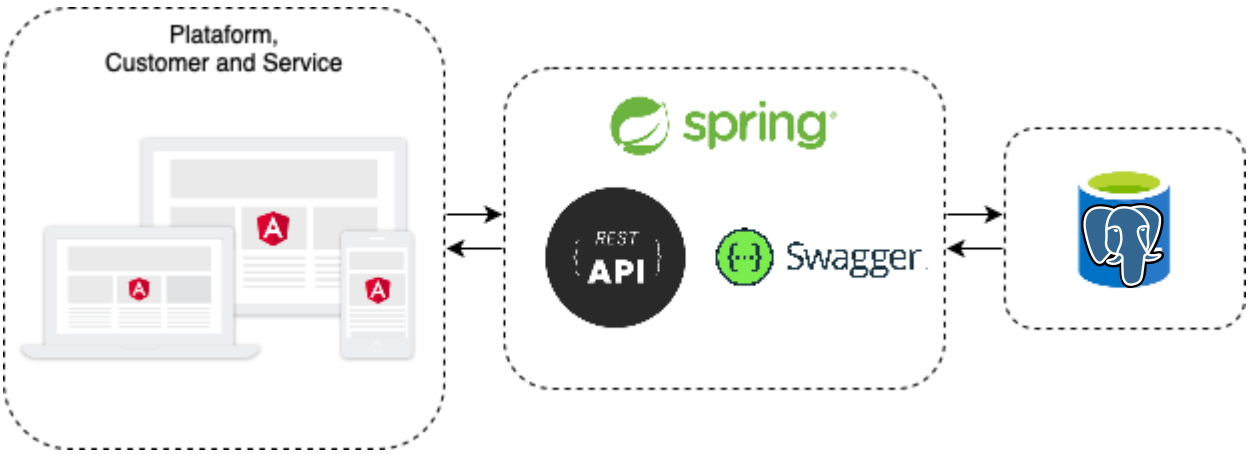


Figure 3 - Architecture view

4.3 Deployment architecture

The project was deployed on a Virtual Machine provided by the university ICT Services, that the professor granted us access to.
The CD Pipeline, which was configured using a Self-Hosted GitHub Runner, will execute whenever a commit is made to the *main* branch. As a result, the project will be deployed after the DevOps Master has released the project with a Pull Request to said branch, which is later reviewed by a team member.

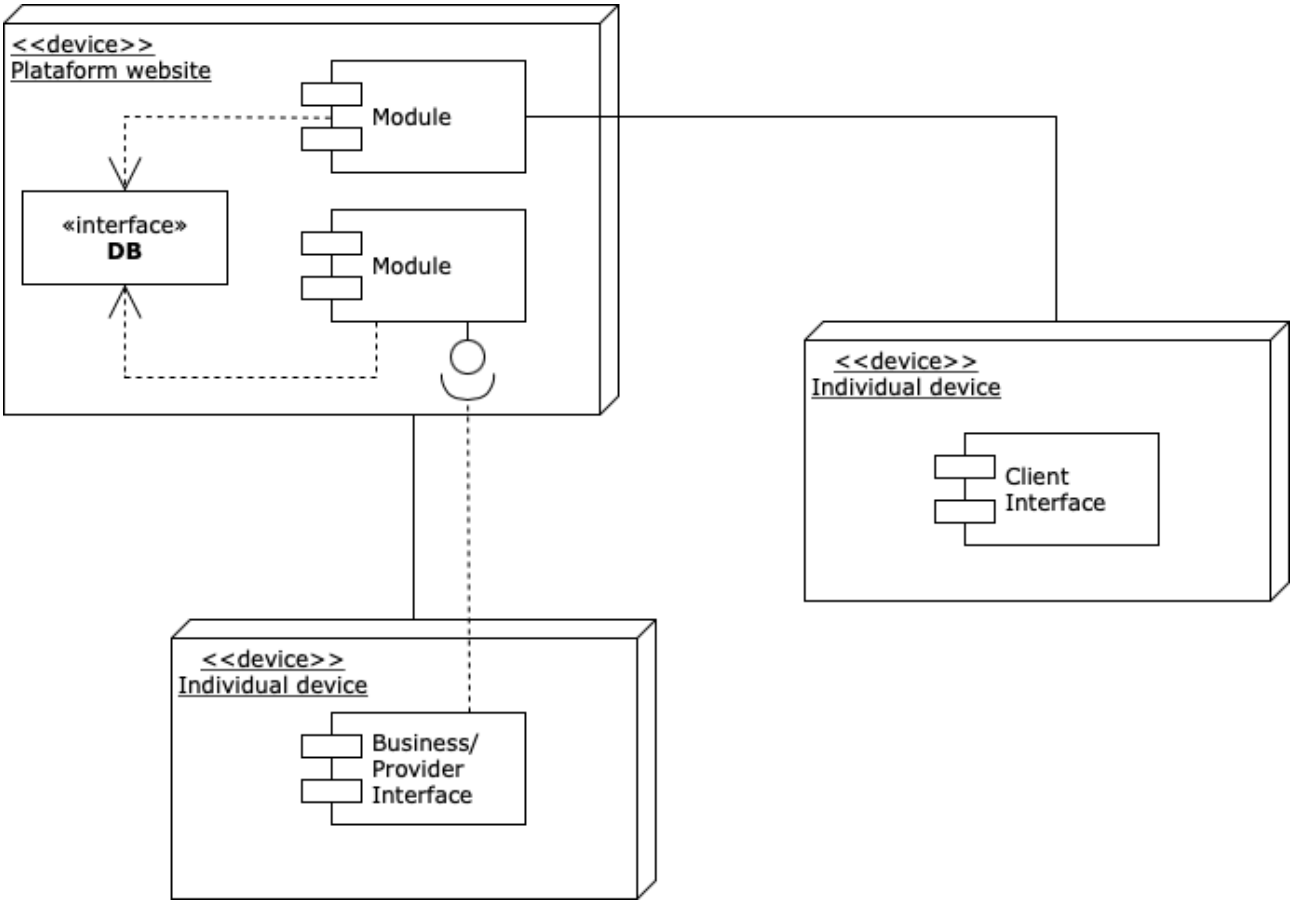
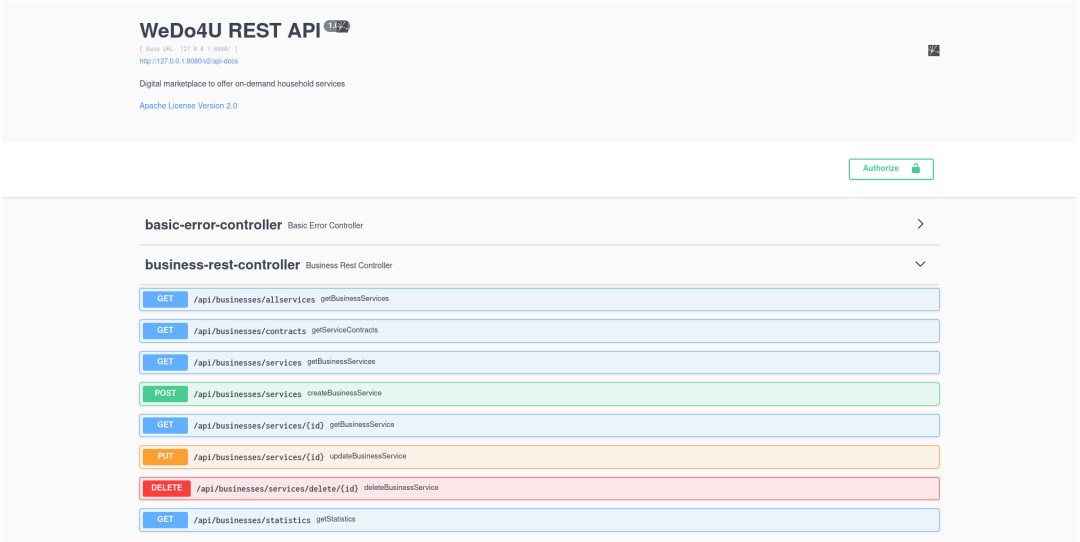


Figure 4 - Deployment diagram

5 API for developers

The image below shows an example of the Swagger Documentation generated for the WeDo4U Engine.
Given the fact that several endpoints were developed in order to support the whole architecture, the full documentation can be found on the URL address mentioned in the Repository's README file.



6 References and resources

https://spring.io/projects/spring-security
https://www.baeldung.com/websockets-spring
https://docs.github.com/en/actions/hosting-your-own-runners/adding-self-hosted-runners#adding-a-self-hosted-runner-to-an-organization