Republic of Tunisia
The Ministry of Higher Education
and Scientific Research

The University of Carthage

The Higher Institute of Information and
Communication Technologies

END-OF-STUDY PROJECT REPORT

Submitted in Partial Fulfillment of the Requirements for the
BACHELOR DEGREE IN SOFTWARE ENGINEERING AND INFORMATION SYSTEMS

Field of Study : Software Engineering and Information Systems

Development of an Employment Services Web Platform

By
ISLEM BARGAOUI
YUSSEF MRABET

Conducted within ...

Code Cooperation

Academic Year: 2021-2022

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Authorization of graduation project report submission:

Professional Supervisor:
Karim Hamrouni

Issued on :

Signature:

Academic Supervisor:
Fahima Ben Guirat

Issued on :

Signature:

Dedications

To my family **Mounir Bargaoui** and **Sawcen Ben Khayatia**,
thank you for your unwavering support and encouragement throughout my academic journey. Your belief in me has been the foundation upon which I have built my success, and I am forever grateful for your love and guidance,
I would like to express my gratitude to my friends for their unwavering support and encouragement. Your constant inspiration and motivation have been instrumental in my academic journey, and I am thankful for your presence in my life. .

Islem Bargaoui

With great pride, sincerity and affection, I dedicate this work to all the people who have significantly influenced my life. To my parents, who instilled in me the most important values in life and who have been my constant mentors throughout my educational and professional journey.

To my sisters, who have supported and encouraged me in all my endeavors, and who have always given me the strength to pursue my dreams. To my closest friends, who have been a constant source of joy, laughter and support throughout my life. I also dedicate this work to all the people who believed in me, trusted me, and allowed me to grow as an individual. Let this modest work be an expression of my gratitude and love to all of you. I thank you for your moral support and encouragement throughout my journey. You have been strong pillars in my life and I am deeply grateful for your presence. I wish you all the happiness, peace and prosperity that you deserve. You are the reason I did this work, and I am honored to be able to share it with you all.

Yussef Mrabet

To our Supervisors, **Dr. Fahima Ben Guirat and Karim Hamrouni**, For believing in us and helping us finish our end of studies project, you have our most grateful thanks.

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General introduction

In today's fast-paced and competitive world, finding employment can be a challenging and daunting task. While job boards and employment agencies exist, they may not always provide the best fit for job seekers or employers.

To address this issue, we present TippJob, a platform that connects individuals or businesses offering jobs with those seeking employment opportunities. TippJob offers a simple and efficient way to post job offers, whether it's for a full-time position or a one-time task, such as mowing a lawn. By creating a user-friendly interface, TippJob aims to make the job search process easier and more accessible for all users.

Our end-of-studies project provides an opportunity to develop this platform further and improve the user experience. Throughout this report, we will discuss the context of the project, the requirements specifications, and the implementation process of TippJob.

During our internship at Code Cooperation, we have followed the scrum Methodology to better organize our work and development, thus making our report consist of these following chapters:

- "**Context of the project**", The initial chapter will serve as an introductory study and provide the project's contextual background as well as the infrastructure and general architecture of the project.
- "**Requirements Specification**", The second chapter of this report will be dedicated to outlining the project requirements, which is considered the first and most significant step in our development process. We will provide a detailed description of these requirements.
- "**Release 1: User Profile Management**", This first release aims to provide users with an intuitive and seamless experience when creating and managing their profiles, enabling them to maintain control over their data..
- "**Release 2: Payment Integration and Job Posts**", the second release adds payment integration and job posting features, improving the platform's user-friendliness and value.
- "**Release 3: Enhanced User Experience**", The third and final release will introduce new search filters and messaging functionalities, designed to enhance user interactions and facilitate communication among users.

Chapter 1

Context of the project

1.1 Introduction

This chapter provides an overview of the host organization, details the project developed, outlines the technology choices made, and explains the methodology followed.

1.2 Presentation of the host organization

1.2.1 Host organization:

Code Cooperation is a startup builder and software development agency co-founded by Mr Taib Ben Dai as a CTO and Mr Mutas Bezari as a CEO. Their mission is to help startups bring their ideas to life through the development and deployment of web and mobile applications. Code Cooperation has worked with notable clients such as GIZ and TRANSLATLY.

What sets Code Cooperation apart from other agencies is their commitment to long-term partnerships with startups. They are interested in becoming a founding partner of the client's startup and being paid by equity, rather than short-term earnings. Code Cooperation's main idea is to offer startups of different stages a scalable CTO and/or development support, ranging from building a complete application to separate modules, components, and/or features. They charge only their low self-costs for this work, demonstrating their dedication to the success of their clients.

Figure 1.1: Company Logo

1.2.2 Areas of activity

The company specializes in providing solutions for businesses and startups, drawing upon their expertise in three primary sectors: software engineering, technical assistance, and consulting. Some examples of their solutions include:

- Ilioa Music
- Translatly
- seniorenplatzfinder
- relokatehr

1.3 Project presentation

1.3.1 Project framework

In today's fast-paced world, finding and offering job opportunities can be a time-consuming and challenging process. To address this issue, we developed Tippjob, a platform that connects job seekers and employers in a simple and efficient way. The platform provides a user-friendly interface for job posting, browsing, and applying.

1.3.2 Study of the existing

There are already several online job platforms available to the public, such as LinkedIn, Glassdoor, and Indeed. However, these platforms have their limitations and drawbacks that may cause inconvenience to job seekers, employers, and recruiters. Some of these limitations include:

- Traditional job platforms typically focus on full-time, long-term positions, while neglecting short-term, one-off, or part-time job opportunities.
- Limitation to certain industries or job types, making the user's choices narrow for a wider range of job offers.
- Candidates have to go through a lengthy application and screening process, which may not be necessary or practical for one-time or short-term jobs.
- Focusing on connecting candidates with employers, and missing the ability for individuals to post job offers for services they need (e.g. lawn mowing, pet care, etc.).
- Requirement for job seekers to have an established professional profile or resume, which could be a barrier for individuals who are just starting out or looking for casual work.

1.3.3 Proposed solution

With the increasing demand for job opportunities and the limitations of current job posting platforms, TippJob offers a comprehensive solution that connects job seekers and job providers in an easy-to-use platform. Using cutting-edge technologies and an intuitive interface, TippJob offers the following features:

- Seamless job posting and search functionalities for both employers and job seekers.
- Having a wide range of job types, from short-term to one-off, limited only by the user's imagination.
- The ability be more general about industries and cover a wider range of job offers.
- The posting and application process is streamlined to be quick and easy.
- This solution is not limited to connecting candidates with employers but could also allow individuals to post job offers for services they need (e.g. lawn mowing, pet care, etc.).

1.4 Project management Methodology

1.4.1 Methodology

The decision has been made that Scrum is the most appropriate and well-structured methodology for this project. However, for those unfamiliar, what exactly is Scrum?
It is a framework that promotes team collaboration in planning, developing, delivering, and sustaining products in different work settings using an agile and organized approach. The framework encourages decision-making based on past experiences and continuous learning from current work, allowing for reflection and improvement. Despite its structured nature, the Scrum framework remains agile and flexible, as depicted in the accompanying figure.

Figure 1.2: Scrum Structure[11]

The figure presented above illustrates the main stages involved in utilizing the SCRUM framework, which are as follows:

1. The product owner typically leads the creation of the backlog.
2. Team members plan the order in which to work on features based on their level of importance, defining the sprints.
3. Daily Scrum meetings, attended by the scrum master and team members, are held to provide daily progress reports.

1.5 Technical Choice

1.5.1 Development Technologies & Frameworks

Figure 1.3: Next.JS[8]
Description: Nest.js is a Node.js framework that provides a structured approach to building scalable and maintainable server-side applications. It was used for the back-end of the project.

Figure 1.4: Nest.JS[7]
Description: Next.js is a React framework that allows for server-side rendering and static site generation. It also includes features like automatic code splitting and optimized performance. It was used for the front-end of the project.

Figure 1.5: Prisma ORM[10]
Description: Prisma is a modern ORM for Node.js and TypeScript that provides a type-safe and easy-to-use database access layer. It was used to connect the Nest.js back-end to the MySQL database.

Figure 1.6: MySQL[6]
Description: MySQL is a popular open-source relational database management system. It was used as the database for the project.

Figure 1.7: Material UI[5]
Description: Material UI is a React UI framework that provides pre-built components with a consistent design language based on Google's Material Design. It was used for the front-end of the project to create a modern and responsive user interface.

Figure 1.8: OpenAPI[9]
Description: OpenAPI is a specification for building APIs that allows for automated generation of documentation, client libraries, and server stubs. It was used to define the API endpoints for the project.

Figure 1.9: Sonar[13]
Description: Sonar is a platform for continuous code quality inspection that provides metrics, code analysis, and feedback on code quality. It was used to ensure code quality throughout the development process.

Figure 1.10: Swagger[14]
Description: Swagger is a toolset for designing, documenting, and testing APIs. It provides a user-friendly interface for defining API endpoints and parameters, and generates interactive documentation for developers. It also includes testing tools for verifying API behavior.

Figure 1.11: Digital Ocean[1]
Description: DigitalOcean is a cloud infrastructure provider that offers a range of cloud-based services for deploying and scaling web applications. It provides a simple and cost-effective platform, with a user-friendly interface and strong community support. it was used for the deployment of the project

1.5.2 Collaboration and Developement Tools

Figure 1.12: Visual Studio Code[15]
Description: Visual Studio Code (VScode) is a popular code editor that offers a wide range of features and extensions to enhance productivity and streamline development workflows. It supports multiple programming languages and provides features such as IntelliSense, debugging, version control, and more.

Figure 1.13: Github Desktop[4]
Description: Github Desktop is a user-friendly desktop client for Github that makes it easy to manage repositories, collaborate with team members, and perform basic Git operations such as committing, branching, and merging.

Figure 1.14: Github[3]
Description: Github is a web-based platform for version control and collaboration that enables developers to store and manage code repositories, track changes, collaborate with team members, and perform code reviews.

Figure 1.15: Slack [12]
Description: Slack is a popular team communication tool that allows teams to collaborate and communicate in real-time via channels, direct messages, and integrations with other tools. It offers features such as file sharing, video calls, and app integrations.

Figure 1.16: Figma [2]
Description: Figma is a web-based design and prototyping tool that enables teams to collaborate on designing user interfaces, graphics, and other visual elements. It offers features such as vector editing, collaboration tools, and real-time design feedback.

1.6 General Architecture

We will use a deployment diagram to illustrate the overall architecture of our project, which includes the MSC stack architecture.

1.6.1 Deployment Diagram

A deployment diagram is a UML diagram that offers a clear and concise way to illustrate the architecture of a system. It shows how the different software components are distributed across hardware and execution environments, as well as how they interact through middleware.
Our project's deployment diagram is displayed in the figure below, offering a comprehensive overview of our system's architecture.

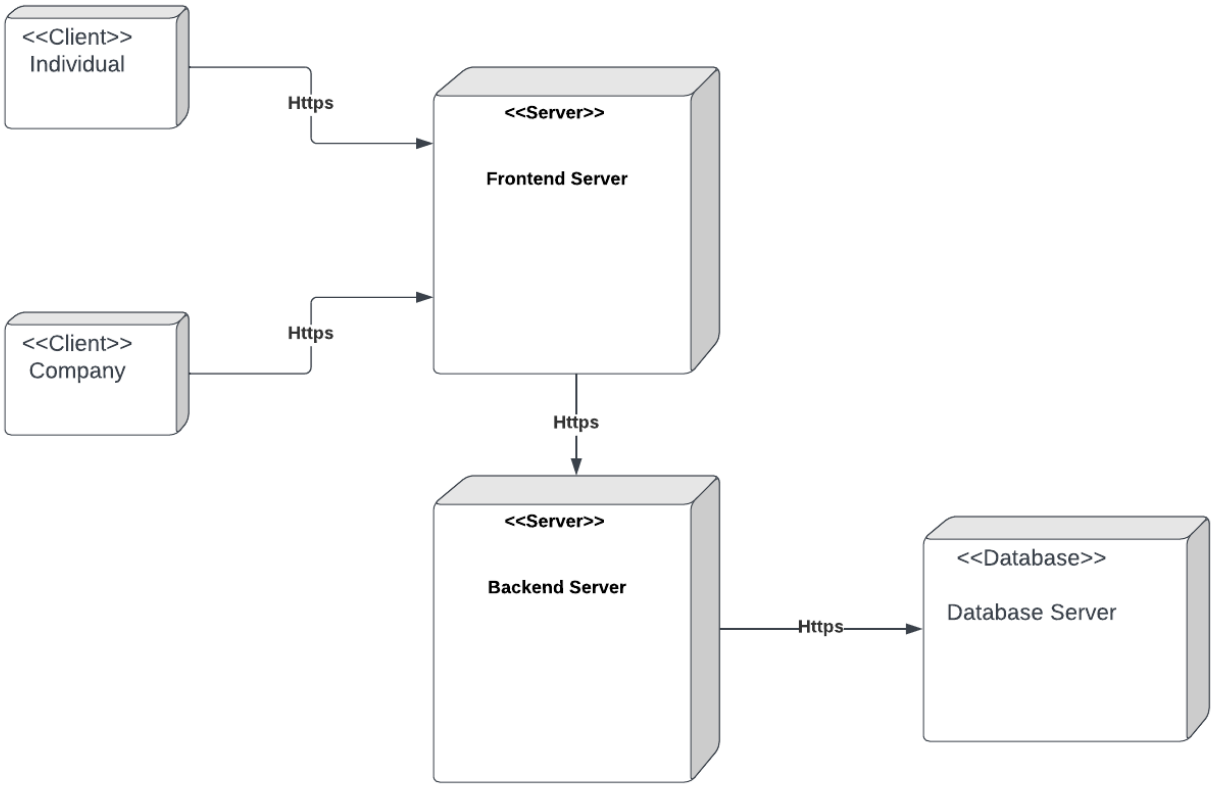

Figure 1.17: Deployment Diagram

1.6.2 MSC Stack Architecture

MSC, or Model-Service-Controller, is a variation of the traditional Model-View-Controller (MVC) architecture commonly used in web application development. In MSC, the View component is replaced by a Service component that encapsulates the business logic of the application. This approach promotes greater separation of concerns and can lead to a more modular and scalable application architecture.

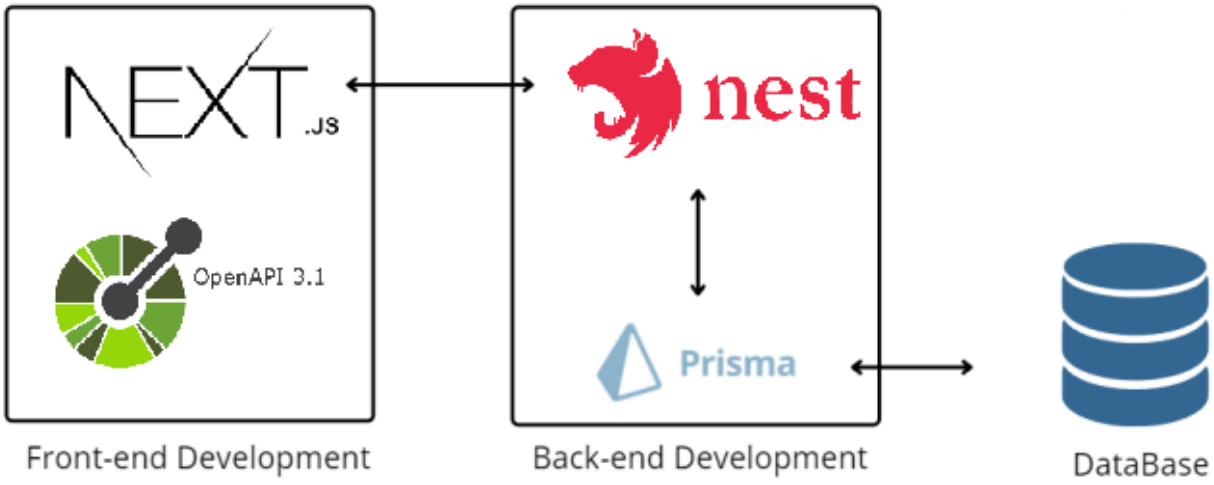

Figure 1.18: MSC Diagram

1.6.3 CI Architecture

Continuous Integration (CI) is a software development practice that involves frequently integrating and testing code changes to catch bugs and ensure that the software remains functional and stable throughout the development process. CI involves automating the build, test, and deployment process of software, allowing developers to quickly identify and fix issues as they arise. By integrating code changes frequently, CI helps to prevent integration problems that can occur when multiple developers work on the same codebase. This results in faster development cycles, higher quality software, and more efficient use of resources. the following figure represents our CI process.

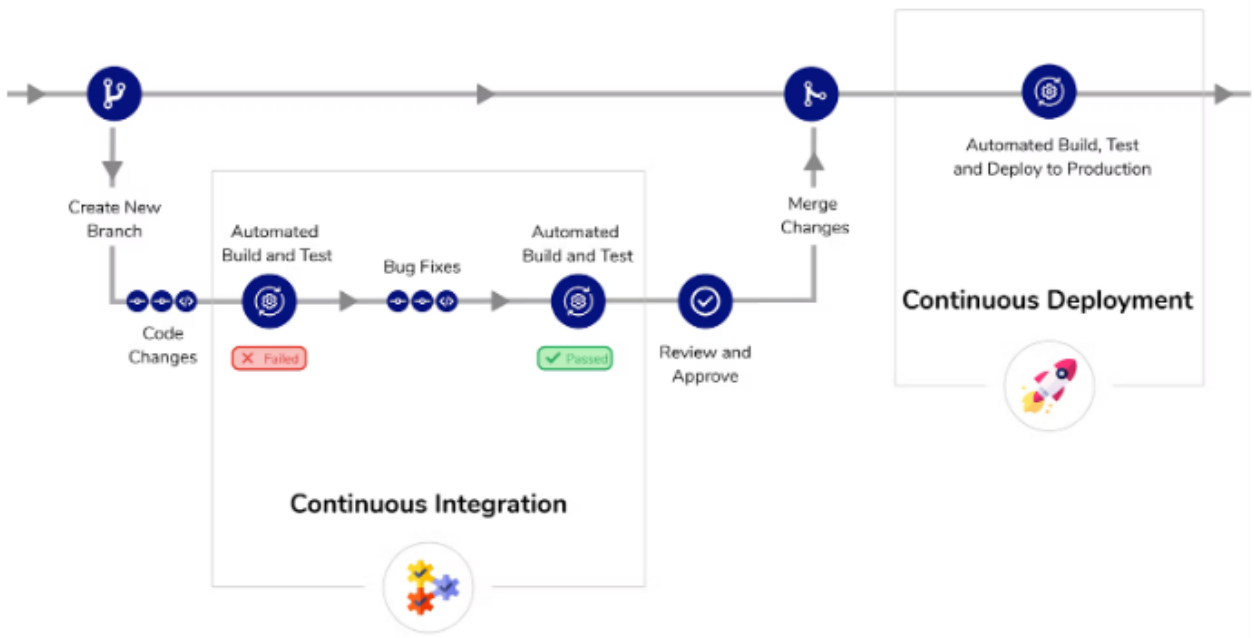

Figure 1.19: CI Diagram

1.7 Conclusion

This chapter outlines the overall framework of the internship program, and serves as a segue to the subsequent phase of needs specification and planning.

Chapter 2

Requirements Specification

2.1 Introduction

In this chapter, we begin our work by defining the project's requirements and identifying the different actors involved. We then create a general use case diagram to model everything, which is followed by the development of a product backlog. The product backlog serves as a critical tool in explaining the different aspects of our work.

2.2 Requirements Specification

Our primary objective is to develop and launch a functional and successful product, which necessitates a meticulous and systematic approach to requirement analysis. This involves clearly defining the software's intended functionality, performance expectations, and the necessary features to meet the requirements of our users. These needs can be classified into two distinct categories:

2.2.1 Functional requirements

Functional requirements refer to the specific services and functions that a software must provide. It is important to clearly define them for both the development team and users to ensure that the software meets their expectations.
In our project, we have identified the following functional requirements that our software must adhere to:

- **Register:** Users can create a new account with their personal information.
- **Login:** Users can access their account with their email and password.
- **Reset Password:** Users can reset their password in case they forgot it.
- **Manage profile:** During the onboarding process, users are given the ability to create a personalized profile page which includes a profile gallery, profile picture, and information. Additionally, users can easily update or delete their profile information as needed (account info included).
- **Edit user info and settings:** Users can modify their personal information and settings including visibility to other users.
- **Consult posts:** Users can view posts published by other users.

- **Consult users profiles:** Users can view profiles of other users.
- **Manage Posts:** Users can create, edit, and delete their own posts, they can be urgent or normal posts.
- **Pay for a Job Post:** The payment system integrated into the web app empowers the user to extend the duration of their job offer's visibility beyond the default time frame. This functionality provides the user with greater flexibility and control over their job postings, enabling them to adapt to unforeseen circumstances and maximize their chances of finding suitable candidates.
- **Favorite posts:** Users can mark posts as their favorites to access them easily later.
- **Search for posts:** Users can search for posts by keywords or tags.
- **Filter posts:** Users can filter posts by different criteria such as date, category, and author.
- **Message users:** Users can send private messages to other users.

2.2.2 Non-functional needs

A nonfunctional requirement refers to a limitation or condition imposed on a system that is not related to its specific functionalities. Instead, it pertains to aspects such as the environment, implementation, performance, platform dependencies, user-friendliness, maintenance, scalability, and reliability of the system. These constraints play a significant role in the overall success of the software and must be taken into account during the development process.

- **Performance:** The solution must be designed to load quickly and respond promptly to user requests. This means that the system should be able to handle high traffic without compromising performance.
- **Security:** The solution must be secure and protect user data against unauthorized access, data breaches, and cyber attacks. This includes using encryption for sensitive data, implementing authentication and authorization mechanisms, and following industry best practices for security.
- **Reliability:** The solution must be available and operational 24/7. This means that the system should be designed with redundancy and failover mechanisms to ensure that the application is always accessible and that any disruptions are minimal.
- **Scalability:** The solution must be scalable to accommodate growth and changes in user traffic. This means that the system should be designed to handle an increasing number of users and data volume without experiencing performance degradation.

- **Usability:** The web application should be easy to use and intuitive for all users, regardless of their technical knowledge or background. This includes designing a user interface that is easy to navigate, providing clear and concise instructions.
- **Maintainability:** The solution must be easy to maintain, update, and modify without causing disruptions to its functionality or performance.

2.2.3 Identification of the actors

Actor	Identification
User	The web app is designed to cater to a single actor, which can either be an INDIVIDUAL or a COMPANY. Both actors have access to the same functionalities; the only difference being that the COMPANY has a designated company name while the INDIVIDUAL does not. The user can seamlessly interact with all aspects and features of the web app, regardless of their actor type.

2.3 Product Backlog

the following table shows our product backlog :

User Story	Priority	Estimation	Planning	
As a user i can Register	1	High	Sprint 0	**Release 1**
As a User, I can to confirm my account	1	Medium	Sprint 0	
As a user i can Login	1	High	Sprint 0	
As a user i can Reset my password	1	Medium	Sprint 0	
As a user I can see the navbar at the top of the screen change, so that it indicates that I am logged in	1	Low	Sprint 0	
as a user i can create my profile through the onboarding proccess	2	High	Sprint 1	
as a user i can consult my profile	2	Medium	Sprint 1	
as a user i can edit my profile (profile picture, gallery, information)	3	Medium	Sprint 2	
as a user i can edit my account settings (personal information, Visibility, email, password, newsletter)	3	Medium	Sprint 2	
as a user i can delete my account permanently	3	Medium	Sprint 2	
as a user i can post a job offer	4	High	Sprint 3	**Release 2**
as a user i can edit my job offers	4	Medium	Sprint 3	
as a user i can delete my job offer	4	Medium	Sprint 3	
as a user i can pay for my job offers	5	Medium	Sprint 4	
as a user i can consult offers and requests posts	6	Medium	Sprint 5	
as a user i can see some job offers on the landing page	7	High	Sprint 6	**Release 3**
as a user i can search for job offers	7	High	Sprint 6	
as a user i can filter job offers	7	Medium	Sprint 6	
as a user i can favorite job offers	8	Medium	Sprint 7	
as a user i can send e private message through a job offer	8	Medium	Sprint 7	
as a user i can exchange messages with another user	8	High	Sprint 7	

Table 2.1: Product Backlog

2.4 Global Use Cases Diagram

Figure 2.20: Global Use Cases Diagram

2.5 Conclusion

This chapter has allowed us to identify the key Users and their requirements for the project. Subsequently, we established a Product Backlog that served as the foundation for the development of our sprints. This analysis will serve as the basis for our work going forward into Chapter 3.
In the upcoming chapter, we will focus on the first release, "User Profile Management".

Netography

[1] *Digital Ocean*. URL: https://www.digitalocean.com/.

[2] *Figma*. URL: https://www.figma.com//.

[3] *Github*. URL: https://github.com/.

[4] *Github Desktop*. URL: https://desktop.github.com/.

[5] *Material UI*. URL: https://mui.com/.

[6] *MySQL*. URL: https://www.mysql.com/.

[7] *NestJS*. URL: https://nestjs.com/.

[8] *NextJS*. URL: https://nextjs.org/.

[9] *OpenAPO*. URL: https://www.openapis.org/.

[10] *Prisma ORM*. URL: https://www.prisma.io/.

[11] *Scrum*. URL: https://www.journaldunet.fr/web-tech/guide-de-l-entreprise-digitale/1443834-scrum-guide-de-la-methode-agile-star/.

[12] *Slack*. URL: https://slack.com/.

[13] *Sonarcloud*. URL: https://www.sonarsource.com/.

[14] *Swagger*. URL: https://swagger.io/.

[15] *Visual Studio Code*. URL: https://code.visualstudio.com/.