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Final-Year Internship Report

Creation of a CI/CD Pipeline and Development of an Intern
Management Platform

Technologies: PHP, Docker, Headless Drupal, TDD, React, Next.js

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Dedication

“

Not all letters can find the right words. Not all words can capture the depth of gratitude, love, respect, and appreciation I feel. With immense joy and an open heart, I dedicate this modest work:

To my dear, respectful, and wonderful parents, whose unconditional support, sacrifices, and belief in me have been my foundation.

To my brother, my sisters, and my extended family, for their unwavering encouragement.

To my professors at ENSAM Casablanca, for their guidance, wisdom, and for challenging me to push beyond my limits.

To my friends at ENSAM, for the laughter, the late-night study sessions, and the shared triumphs that made this journey unforgettable.

To my colleagues and mentors at VOID, for entrusting me with exciting challenges.

Thank you all for inspiring me to strive for excellence every day.

”

- Hamza

Acknowledgement

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Finally, I dedicate my heartfelt appreciation to my family and friends for their unwavering support, patience, and belief in me. Your presence has been my greatest motivation.

Abstract

This report presents the work carried out during my final-year internship at VOID Digital Agency, a leading independent UX and digital solutions firm in Morocco.

The primary objective was to design and implement a robust CI/CD pipeline and to develop a headless-Drupal-based Intern management platform using PHP, Docker, Test-Driven Development, React, and Next.js.

Secondary tasks included migrating servers from production to test environments, building custom PHP-FPM Docker images, and creating an automated dependency update-checker tool.

The CI/CD pipeline reduced deployment time by over 60%, while the platform centralized intern data, improved onboarding workflows, and enabled real-time progress tracking.

Finally, the report discusses challenges encountered such as container networking, flaky tests, and headless CMS integration and outlines future enhancements, including Kubernetes orchestration and expanded automated maintenance.

Résumé

Ce rapport présente les travaux réalisés dans le cadre de mon stage de fin d'études au sein de VOID Digital Agency, une agence digitale indépendante leader de l'expérience utilisateur au Maroc.

L'objectif principal était de concevoir et de mettre en uvre un pipeline CI/CD robuste ainsi que de développer une plateforme de gestion des stagiaires basée sur un CMS headless Drupal, en utilisant PHP, Docker, le développement piloté par les tests (TDD), React et Next.js.

Les tâches secondaires comprenaient la migration de serveurs d'un environnement de production vers un environnement de test, la création d'images Docker personnalisées pour PHP-FPM, ainsi que le développement d'un outil automatisé de vérification et de mise à jour des dépendances.

Le pipeline CI/CD a permis de réduire de plus de 60% le temps de déploiement, tandis que la plateforme a centralisé la gestion des stagiaires, amélioré les processus d'intégration et permis un suivi en temps réel de leur progression.

Enfin, ce rapport traite des principales difficultés rencontrées telles que le réseau de conteneurs, les tests instables, et l'intégration d'un CMS headless et propose des pistes d'amélioration futures, notamment l'orchestration avec Kubernetes et l'automatisation étendue de la maintenance.

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List of Acronyms

AI	<i>Artificial Intelligence</i>
API	<i>Application Programming Interface</i>
CI/CD	<i>Continuous Integration/Continuous Deployment</i>
CMS	<i>Content Management System</i>
CTA	<i>Call To Action</i>
CV	<i>Curriculum Vitae</i>
DevOps	<i>Development and Operations</i>
Drush	<i>Drupal Shell</i>
GitOps	<i>Git Operations</i>
OWASP	<i>Open Web Application Security Project</i>
PHP-FPM	<i>PHP FastCGI Process Manager</i>
PMO	<i>Project Management Office</i>
QA	<i>Quality Assurance</i>
SDLC	<i>Software Development Life Cycle</i>
SEO/SEA	<i>Search Engine Optimization/Search Engine Advertising</i>
TDD	<i>Test-Driven Development</i>
UX/UI	<i>User Experience/User Interface</i>

General Introduction

In an era where digital experience defines the competitive edge of organizations, building robust, scalable, and user centric web applications is paramount. **VOID** Digital Agency, an independent leader in UX and digital solutions since 2005, combines cutting-edge technologies with agile practices to serve clients across banking, healthcare, telecom, retail, and culture. During my final year internship at **VOID**, I was entrusted with automating deployment workflows and designing a comprehensive Intern Management Platform, underpinned by a headless Drupal CMS and a modern React and Next js frontend.

This report unfolds in five chapters:

1. **Chapter 1:** presents the corporate context: **VOID**'s history, organizational structure, service offerings, and key clients.
2. **Chapter 2:** details the conception and implementation of the CI and CD pipeline and the Intern Management Platform, including architecture, technology choices, and core functionalities.
3. **Chapter 3:** covers side quest projects: server migrations, custom PHP FPM Docker images, and an automated dependency update tool that integrated seamlessly into the pipeline.
4. **Chapter 4:** describes the agile methodology and DevOps tool stack adopted at **VOID**: Scrum ceremonies, GitLab CI, Docker, Drush, and collaboration platforms.
5. **Chapter 5:** analyzes technical challenges encountered, container networking, flaky tests, headless Drupal integration, and synthesizes key lessons learned.

By tracing both my main deliverables and auxiliary tasks, this document highlights how modern DevOps practices and decoupled architectures can accelerate development, ensure quality, and produce maintainable solutions. It also reflects on future enhancements to extend scalability, security, and automation.

1 General Context of the Project

1.1 Introduction

In today's fast-paced digital economy, organizations must deliver **seamless, scalable, and engaging** web experiences to stay ahead. **VOID Digital Agency**, established in 2005, has become a recognized leader in **user experience** and **digital solutions** for banking, healthcare, telecom, retail, and cultural clients.

During my final-year internship at **VOID**, I undertook two parallel streams of work:

- **Core Project:** Design and implementation of a **CI/CD pipeline** alongside a headless-Drupal-based **Intern Management Platform**, automating build-test-deploy workflows and centralizing trainee onboarding, progress tracking, and reporting.
- **Side Projects:** Infrastructure enhancements, including server migrations from production to test environments, building custom **PHP-FPM Docker images**, and developing an automated dependency-update tool integrated into the CI/CD workflow.

By embedding these initiatives within **VOID's** agile framework, this report demonstrates how modern DevOps practices and decoupled architectures can drive both **efficiency** and **quality**, delivering robust, maintainable digital solutions.

1.2 Presentation of VOID



Figure 1.1: Logo of VOID Digital Agency

1. CHAPTER 1. GENERAL CONTEXT OF THE PROJECT

Founded in 2005, **VOID Digital Agency** is an independent Moroccan firm specializing in **user experience** and **digital transformation**. With offices in Casablanca and Paris, VOID serves clients across banking, insurance, healthcare, telecom, retail, and culture. The agency's mission is to design **efficient digital experiences** and build **robust, future-proof architectures** enhanced by **reactive interfaces**.

Over nearly two decades, VOID has grown to a team of 35 multidisciplinary experts, UX/UI designers, frontend and backend developers, DevOps engineers, and project managers, delivering end-to-end solutions from ideation to maintenance. Key offerings include:

- **Strategic Consulting:** Digital strategy, brand audits, and security assessments.
- **Content & Media:** Transmedia storytelling, institutional films, and social-media activations.
- **Digital Platforms:** Headless CMS integrations, custom web/mobile applications, intranet/e-learning solutions, SEO/SEA optimization, and ongoing maintenance.

With a results-driven, data-centric approach, VOID leverages agile methodologies to adapt rapidly to evolving client needs and deliver measurable business value.

1.2.1 Company Identity

Name	VOID Digital Agency
Website	https://www.void.ma/
Industry	Digital Transformation and Web Development
Headquarters	Casablanca & Agadir, Morocco - Paris, France
Founder	Mr. Olivier Delas & Mr. Mehdi Najeddine
Founded Date	2005
Specialties	Drupal, Symfony, React/Next.js, Headless CMS, UX/UI Design, DevOps, Digital Strategy, Agile Project Management

Table 1.1: Company Identity of VOID Digital Agency

Core Values

- **User-Centricity:** Every solution begins with deep user research and iterative testing.
- **Excellence:** Rigorous quality checks, security best practices, and performance optimization.
- **Collaboration:** Cross-functional teamwork and transparent communication with clients.

- **Innovation:** Continuous exploration of new technologies, headless CMS, React, Docker, and AI integrations.

These principles guide every VOID engagement, ensuring that each project is not only visually compelling but also technically sound and scalable.

1.2.2 Organizational Hierarchy

Executive Leadership:

- **Olivier Delas**, Co-Founder & Director of Creative Services
- **Mehdi Najeddine**, Co-Founder & Director of Innovation

Management Team:

- UX/UI Design Lead
- Frontend Development Lead
- Backend Development Lead
- DevOps Engineering Lead
- Project Management Office (PMO)

Delivery Teams:

Cross-functional squads composed of designers, developers, DevOps engineers, and QA specialists, each aligned to specific client verticals (banking, healthcare, telecom, retail, culture).

1.2.3 Technical Stack of VOID

VOID Digital Agency has developed a robust and modern technical ecosystem to deliver high-quality digital solutions tailored to client needs. At its core, VOID relies on **Drupal** for content management, **Symfony** for backend development, and **React/Next.js** for building dynamic and performant frontend applications. This architecture follows a **headless approach**, decoupling frontend and backend to allow greater flexibility, scalability, and seamless integration with mobile and third-party systems.

For development operations and infrastructure management, VOID employs a **DevOps pipeline** based on **Bitbucket** for source control, directly integrated with **Docker Hub** for automated image building upon each push. Deployment and hosting are managed through **EasyPanel**, providing a simplified yet powerful server orchestration system. To

maintain design consistency and promote collaborative work, VOID teams utilize **Figma** for UI/UX design, **Cursor** as a development-enhancing tool, and **Gist** (via GitHub) for internal documentation and knowledge sharing.

This technological foundation, combined with agile workflows and continuous improvement strategies, enables VOID to offer scalable, innovative, and future-proof digital solutions in a constantly evolving market.

1.2.4 Company Solutions

VOID's strategic offerings are structured around four pillars:

- **Ideation Workshops:** Co-creation sessions to align business goals with user needs.
- **Digital Strategy:** Brand audits, market positioning, and roadmap definition.
- **User Research:** Focus groups, usability testing, and data-driven persona development.
- **Security & Compliance Audits:** Technical security reviews and OWASP-aligned assessments [1].

1.2.5 Company Services

VOID delivers end-to-end digital platforms and media services:

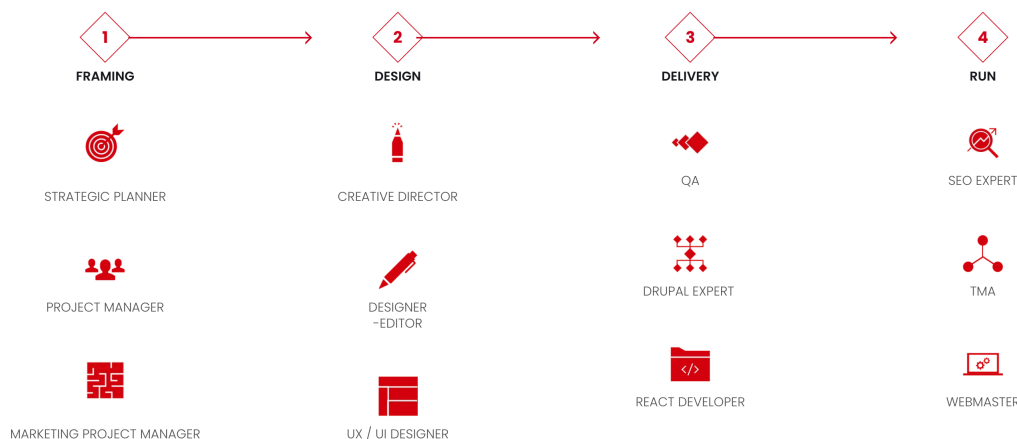


Figure 1.2: VOID Digital Agency Services

- **Transmedia Content** - Corporate videos, product demonstrations, and editorial production.

1. CHAPTER 1. GENERAL CONTEXT OF THE PROJECT

- **Social Media Activation** - Campaign design, content calendars, and performance analytics.
- **Web & Mobile Platforms** - Headless CMS (Drupal) sites, single-page applications (React/Next.js), and e-learning intranets.
- **SEO & Analytics** - On-page optimization, Google Core Web Vitals tuning, and dashboard reporting.
- **Hosting & Maintenance** - Infogérance, 24/7 support, and periodic security updates.

1.2.6 Clients and Projects

Over nearly two decades, **VOID Digital Agency** has earned the trust of a wide range of prestigious clients from various sectors. Its portfolio reflects an exceptional capacity to deliver tailor-made solutions that meet the highest standards of performance and user experience.

The agency's major clients include:



Figure 1.3: VOID Digital Agency Clients

- **Banking and Insurance:** Attijariwafa Bank, Bank of Africa, CIH Bank, Allianz Maroc
- **Healthcare:** Saham Assurance Health Division, CNOPS
- **Telecommunications:** Orange Maroc
- **Retail and Services:** Marjane, Label'Vie

- **Culture and Public Sector:** The Mohammed VI Museum, Moroccan National Tourist Office (ONMT)

Beyond the private sector, **VOID** collaborates with governmental and cultural institutions to craft digital ecosystems that are inclusive, scalable, and centered around user engagement. This diversity in projects demonstrates VOID's ability to adapt its technical expertise and creative methodologies to a variety of contexts, while consistently maintaining excellence and innovation at the core of its services.

1.2.7 Awards and Recognitions

Over the years, **VOID Digital Agency** has been honored with numerous national and international awards, recognizing its commitment to innovation, creativity, and digital excellence. These accolades reflect the agency's dedication to delivering outstanding user experiences and robust technological solutions.

The awards include distinctions from prestigious institutions such as:



Figure 1.4: Awards and recognitions received by VOID Digital Agency.

- Janus du Service (Institut Français du Design)
- Grand Prix Stratégies
- FWA (Favourite Website Awards)
- The Webby Awards
- Cristal Festival
- W3 Awards
- Top/Com Awards

- Cannes Lions International Festival of Creativity
- The Lovie Awards
- World Luxury Award

1.3 The Main Project

The core of the internship was centered around the design and development of an **Intern Management Platform**, an internal solution for **VOID Digital Agency**. The goal was to streamline the onboarding, tracking, evaluation, and reporting processes for interns, while showcasing modern development practices such as **headless CMS architecture**, **agile workflows**, and **continuous deployment pipelines**.

Although the initial division of tasks assigned me the responsibility of **designing the UX/UI** of the platform, **meeting with the head of VOID** to align with the business needs, **developing the frontend** using **React/Next.js**, **integrating it with a headless Drupal backend**, and **implementing Test-Driven Development (TDD)** strategies, in practice we adopted a **dynamic collaboration system**. This system was based on **weekly shifts**, allowing both my colleague and me to contribute to all aspects of the platform: including frontend, backend, DevOps infrastructure, and CI/CD pipelines. This approach ensured a complete understanding of the entire digital ecosystem and promoted continuous knowledge sharing.

1.3.1 Training Phase at VOID

Before engaging in the development of the Intern Management Platform, VOID Digital Agency organized a two and a half months internal training phase. This training covered the main technologies and methodologies required for the project, including Headless Drupal CMS, Next.js development, Agile workflows, DevOps practices, and CI/CD pipelines. The training ensured that all team members were aligned on technical standards and development best practices. The following Gantt chart illustrates the timeline of this initial training phase:

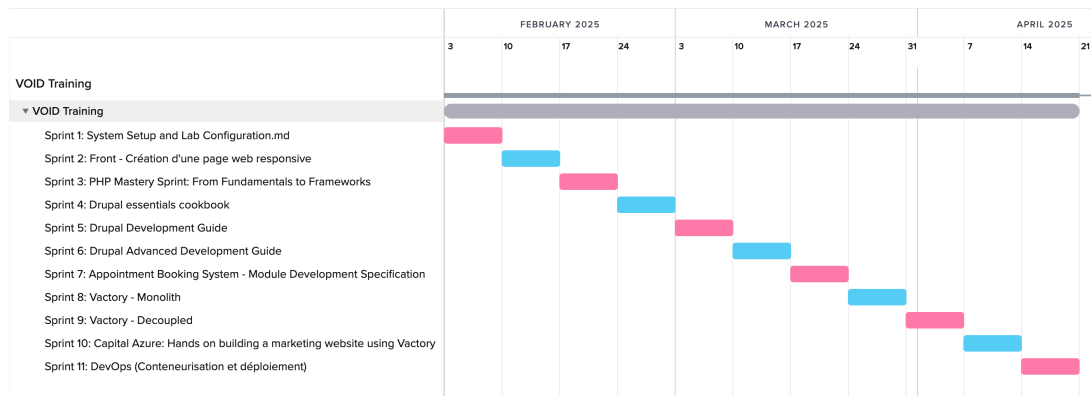


Figure 1.5: Gantt Chart of the Training Phase at VOID

This foundational training was crucial in building the necessary skills and preparing for the successful delivery of the project.

1.3.2 Problematic

VOID, like many digital agencies, manages a significant number of interns each year across various departments development, UX/UI design, marketing, project management, and more. The traditional intern management relied heavily on manual tracking, disconnected communication channels, and dispersed data storage (Excel sheets, emails, local files), resulting in several critical issues:

- Lack of centralized data regarding intern profiles, progress, and evaluations.
- Difficulty for supervisors to monitor onboarding status, project allocations, and intern deliverables.
- Absence of real-time reporting on intern activity, skill assessments, and final evaluations.
- Inconsistencies and inefficiencies in document generation (attestation letters, certificates, evaluation reports).

These limitations not only increased administrative workload, but also slowed decision-making and reduced the overall quality of intern experiences at VOID. A scalable, structured, and automated solution was thus necessary to improve operational efficiency and enhance the agency's capacity to support and evaluate its interns effectively.

1.3.3 Objectives

The Intern Management Platform was designed with the following main objectives:

- **Centralization:** Create a unified platform to store and manage all intern-related data, from applications to evaluations.
- **Automation:** Automate key workflows such as onboarding tracking, evaluation form generation, and certificate issuance.
- **Scalability:** Build the system with a scalable architecture using **headless Drupal** and **Next.js**, ensuring future extensibility (adding new modules like training plans, skill assessments, etc.).
- **User Experience:** Offer an intuitive and efficient user experience for both **candidates** and **employers** through a clean and responsive UX/UI design.
- **Monitoring and Reporting:** Equip supervisors with real-time dashboards and reporting tools to track intern progression, performance, and document generation.
- **DevOps and CI/CD:** Ensure that the deployment of the platform follows best practices with a robust CI/CD pipeline, enabling automated testing, building, and deployment processes.

While I was initially focused on the UX/UI design and the development of the **Candidate Space** (frontend and backend), thanks to our rotation system, I actively contributed across all project dimensions, including DevOps setup, backend integrations, and global system testing.

1.3.4 Proposed Solution

To meet the objectives and address the problems identified, the proposed solution was to design and build a comprehensive **Intern Management Platform** structured into three interconnected modules:

- **Website:** A public-facing site aimed at presenting VOID's internship program, its philosophy, stages, and benefits. It includes a **Call-to-Action (CTA)** allowing candidates to apply directly. This site serves as the primary entry point to attract and engage potential interns.
- **Candidate Space (Espace Candidat):** A dedicated portal where candidates can:
 - Browse internship offers posted by VOID.
 - Apply to internships by submitting personal information, CVs, cover letters, and any other required documents.
 - Track the status of their application (in progress, accepted, rejected).
 - Participate in tests and interviews conducted as part of the recruitment process.

This space was built using **React/Next.js** for the frontend and connected to a **headless Drupal CMS** backend serving structured data via APIs, ensuring flexibility, scalability, and performance.

- **Training Space (Espace Formation):** Once accepted, interns gain access to this space, modeled after modern online learning platforms such as Coursera. Here, they can:
 - Follow predefined training roadmaps aligned with VOID’s standards.
 - Access courses, videos, assignments, and learning materials.
 - Complete projects and quizzes over a three-month structured program.
 - Monitor their own progression through dashboards and receive feedback from supervisors.

This module supports VOID’s mission of continuous learning and ensures that interns are fully prepared for their assigned roles.

The technical implementation was based on a **headless architecture**, where Drupal managed the content models, permissions, and workflows, while the frontend was fully decoupled, using **Next.js** for server-side rendering and dynamic interaction. The backend exposed structured data through **JSON:API** endpoints, and all user interactions were designed to be smooth and reactive, respecting the best practices of modern UX/UI design.

Additionally, the entire project was developed following **Test-Driven Development (TDD)** principles to guarantee robust and reliable features, and deployed using a full **CI/CD pipeline** to automate testing, building, and production delivery.

Although my initial responsibilities mainly covered the **UX/UI design, meetings with the head of VOID**, the development of the **Candidate Space** (frontend and headless backend integration), and **TDD implementation**, our **rotation system** allowed me to work on all areas, including the **Training Space** and infrastructure tasks. This dynamic approach enhanced my skills across the complete technological stack and provided a holistic understanding of the system lifecycle.

1.4 The Side Projects

1.4.1 Problematic

In parallel with the main Intern Management Platform project, VOID Digital Agency often encourages interns to contribute to smaller internal initiatives, known as **side projects**. These projects are crucial for addressing internal operational needs, testing new technologies, and improving the agency’s digital ecosystem. During my internship, I

was tasked with participating in the development and enhancement of several side projects that aimed to streamline internal workflows and enrich VOID's technical stack.

However, the side projects also posed certain challenges:

- Managing time between the main project and side initiatives without impacting overall deadlines.
- Quickly adapting to different technical contexts (varying tech stacks, objectives, team sizes).
- Maintaining a high level of code quality and documentation despite shorter time-lines.

1.4.2 Objectives

The objectives behind working on side projects were:

- **Skill Diversification:** Expose interns to different technologies and problem-solving contexts.
- **Internal Efficiency:** Develop tools or features that optimize VOID's internal operations.
- **Innovation:** Experiment with new technologies (e.g., emerging frameworks, DevOps techniques) without risking main production systems.
- **Collaboration:** Foster collaboration across different teams and encourage knowledge sharing.
- **Professionalism:** Apply the same development standards (agile, TDD, CI/CD) used in main projects, even for small-scale tools.

1.4.3 Proposed Solution

Throughout my internship, I contributed to two major side projects that played a significant role in enhancing VOID's internal infrastructure and its client service capabilities:

- **Project Migration to Internal Infrastructure:** As part of VOID's initiative to internalize hosting services, I participated in the migration of the official website of [CMI \(Centre Monétique Interbancaire\)](#) from the *sooninprod* external cloud server to the newly acquired *leserveurdetest* (an Apple Mac Studio server). This task involved:
 - Building a custom Docker image to support an older PHP version required by the legacy project.

- Migrating and reconfiguring the database to match the new environment specifications.
 - Ensuring compatibility between the existing codebase and the new server settings.
 - Performing comprehensive testing post-migration to guarantee full operational stability.
- **Custom Module Development for VOID Factory (Vactory):** VOID Digital Agency leverages its proprietary technical foundation called the **VOID Factory**, a product of over a decade of digital experience and innovation. The VOID Factory, maintained and evolved by the internal Core Team, is based on robust open-source technologies such as Drupal, Symfony, and React, and follows agile development practices to stay aligned with modern digital standards. As part of the continuous evolution of Vactory, I was tasked with:
 - Developing custom Drupal modules needed for client-specific requirements, including an **Appointment Booking Module**.
 - Adhering to the Factory’s high standards for modularity, scalability, and integration with decoupled architectures.
 - Following best practices in automated testing and DevOps processes to ensure production-quality deliverables.

These side projects allowed me to deepen my technical skills across DevOps, backend development, and modular architecture design, while also contributing tangible value to VOID’s internal operations and client offerings.

1.5 Project Management Methodology

1.5.1 Agile Methodology

VOID adopts an **Agile methodology**, specifically the **Scrum framework**, to manage and deliver its digital projects efficiently. The iterative approach ensures flexibility, faster feedback loops, and continuous improvement throughout the development lifecycle.

Each project follows the **Software Development Life Cycle (SDLC)** principles, combined with **GitOps** practices to automate deployment pipelines and infrastructure operations. Regular sprint planning, daily stand-ups, sprint reviews, and retrospectives form the core rhythm of project execution.

1. CHAPTER 1. GENERAL CONTEXT OF THE PROJECT

Software Development Lifecycle

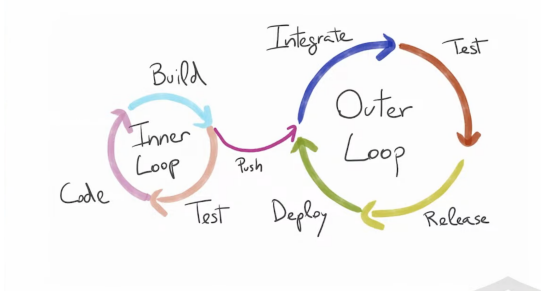


Figure 1.6: Software Development Life Cycle (SDLC)

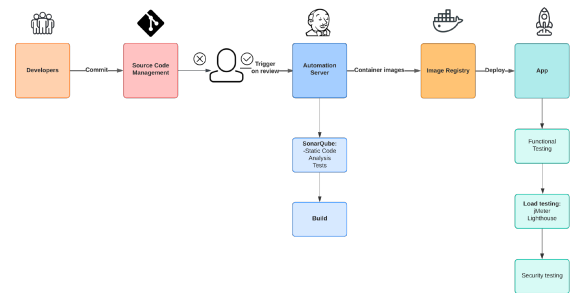


Figure 1.7: GitOps Practices

1.5.2 Organization and Communication Tools

VOID leverages a combination of tools to streamline project tracking, team communication, and task management:

- **Redmine:** Internal project management tool similar to Jira, featuring Gantt charts and Kanban boards for visual task tracking.

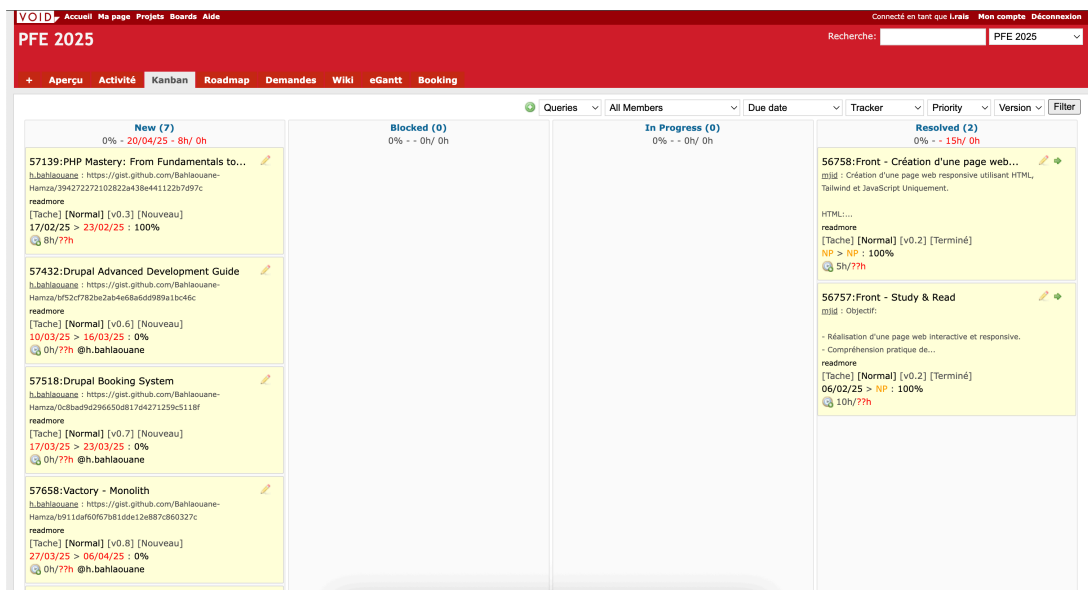


Figure 1.8: Redmine project management tool

- **Slack:** Instant messaging platform for real-time team communication.



Figure 1.9: Slack messaging platform

- **Loom:** Tool used for recording and sharing explanatory videos with the internal team.



Figure 1.10: Loom video recording tool

- **Google Meet:** Video conferencing tool used for meetings, stand-ups, and sprint reviews.



Figure 1.11: Google Meet video conferencing tool

- **Google Calendar:** Calendar management to organize meetings, deadlines, and sprint cycles.



Figure 1.12: Google Calendar for scheduling

The combination of these tools enables smooth communication, clear project tracking, and efficient collaboration across all teams at VOID.

1.6 Conclusion

This first chapter has established the general framework of the project by presenting **VOID Digital Agency**, its organizational structure, and its technical ecosystem. We have also defined the context and objectives of the main project, highlighted the problems it aims to solve, and outlined the chosen implementation approach and project management methodology.

This foundation sets the stage for a deeper exploration of the project requirements. The next chapter will focus on the detailed analysis and specification of the functional and technical needs essential for the successful realization of the platform.

2 Main Project Design & Analysis

This technique is widely used in modern development [2].

According to (**author?**) [3], proper typesetting is essential.

Security vulnerabilities must be addressed early [4, p. 238].

Several studies support this approach [2, 5?].

3 Main Project Implementation

4 Main Project Showcase & Results Overview

5 Side Projects

6 Technical Environment, Achievements and Difficulties Encountered

7 Conclusion and Future Work

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