Complex Systems and DevOps: Deliverable 2

Date: November 25, 2024

Course Details

Course Name: Complex Systems and DevOps **Course Code:** 62582 **Semester:** Fall 2024

Team Members

Name	Student Number
Christoffer Fink	*s205449*
Kasper Falch Skov	*s205429*
Johan Søgaard Jørgensen	*s224324*
Henrik Lynggaard Skindhøj	*s205464*
Kevin Wang Højgaard	*s195166*
Sebastian Halfdan Lauridsen	*s215769*

Link to GitHub Project

Table of Contents

1. Introduction
    - Project Scope and Objectives
    - Problem Statement and Solution Overview
    - Methodology

I. Analysis

2. Domain Analysis
    - User Stories and Requirements
    - System Architecture Overview
    - Technical Stack Selection
    - Security Requirements
3. Technical Foundation
    - Framework Selection Rationale
    - Development Environment Setup
    - Project Structure

II. Implementation and DevOps Practices

4. Backend Development
    - Quarkus Framework Implementation
    - REST API Design with Siren Hypermedia
    - Database Integration
    - Business Logic Implementation
    - Security Implementation
        - JWT Authentication
        - Backend Security Measures
    - Testing Strategy
        - JUnit Implementation
        - REST-assured Testing
    - OpenAPI Documentation
5. Frontend Development
    - React Application Structure
    - TypeScript Integration
    - Vite Build Tool Implementation
    - State Management
    - Component Architecture
    - Security Features
        - Token Security Implementation
    - Package Management
6. DevOps Implementation
    - Version Control Practices
        - Git Workflow
        - GitHub Integration
    - Continuous Integration/Continuous Deployment
        - GitHub Actions Configuration
        - Build Server Setup
        - Testing Pipeline
    - Containerization
        - Docker Implementation
        - Container Registry
    - Cloud Deployment
        - Google Cloud Setup
        - Netlify Frontend Deployment
    - Monitoring and Maintenance
7. Conclusion
    - Project Outcomes
    - Future Improvements
    - Lessons Learned

---

1. Introduction

Project Scope and Objectives

Problem Statement and Solution Overview

Methodology

I. Analysis

2. Domain Analysis

User Stories and Requirements

System Architecture Overview

Technical Stack Selection

Security Requirements

3. Technical Foundation

Framework Selection Rationale

Development Environment Setup

Project Structure

II. Implementation and DevOps Practices

4. Backend Development

Quarkus Framework Implementation

REST API Design with Siren Hypermedia

Database Integration

Business Logic Implementation

Security Implementation

JWT Authentication

Backend Security Measures

Testing Strategy

JUnit Implementation

REST-assured Testing

OpenAPI Documentation

5. Frontend Development

React Application Structure

TypeScript Integration

Vite Build Tool Implementation

State Management

Component Architecture

Security Features

Token Security Implementation

Package Management

6. DevOps Implementation

Version Control Practices

Git Workflow

GitHub Integration

Continuous Integration/Continuous Deployment

GitHub Actions Configuration

Build Server Setup

Testing Pipeline

Containerization

Docker Implementation

Container Registry

Cloud Deployment

Google Cloud Setup

Netlify Frontend Deployment

Monitoring and Maintenance

7. Conclusion

Project Outcomes

Future Improvements

Lessons Learned