Identification of Module Boundaries in a Modular Monolith Architecture using Automated technologies

University of Turku

Department of Computing

Master of Science (Tech) Thesis

February 2024

Florian Dejonckheere

UNIVERSITY OF TURKU
Department of Computing

Florian Dejonckheere: Identification of Module Boundaries in a Modular Monolith Architecture using Automated technologies

Master of Science (Tech) Thesis, 4 p., 4 app. p.
Department of Computing
February 2024

The modular monolith architecture emerged in recent years as the harmonization of the monolithic and microservices architectures. The paradigm offers a compromise between modularity, flexibility, and scalability. Many monolithic applications are being migrated to modular monoliths or microservices entirely, to satisfy increasingly complex and volatile business requirements. This process is labour-intensive, slow, and may take months to years for larger codebases. Modularization of a codebase typically requires the developer to have an intimate knowledge of both the application code and domain.

In this thesis, we investigate the modular monolith software architecture, and how modules are typically determined as part of the modularization efforts. We propose an automated solution based on dependency analysis and machine learning algorithms to aid in the identification of module boundaries, and evaluate its effectiveness using a case study. We discuss the results and draw conclusions about the propsed solution.

Keywords: software architecture, monolith, microservices, modular monolith

Contents

List of Figures

List of Tables

List of Acronyms

API	Application Programming Interface
UI	User Interface

1. Introduction

1.1. Problem description

1.2. Scope and goal

1.3. Motivation

1.4. Methodology

1.5. Outline

2. Background

2.1. Monolith architecture

2.2. Microservice architecture

3. Related work

4. Modular monolith architecture

4.1. Background

4.2. Challenges and opportunities

4.3. Modularization

5. Proposed solution

6. Case study

6.1. Background

6.2. Analysis

6.3. Evaluation and results

6.4. Discussion

7. Conclusion

7.1. Future work

References