REFS Yard Modeling Process Report

Abstract

This report summarizes the creation of four modeling artifacts for REFS Yard, a web-based platform for selling academic and non-academic references: Use Case Diagram, IFML Diagram, BPMN Diagram, and Class Diagram. Kroki pages in the Kroki directory provide navigable text-based documentation, while PNG images in the Designs directory offer visual records. The process, tools, challenges, and outcomes are detailed, ensuring alignment with requirements for efficient reference access and superior user experience.

Introduction

REFS Yard aims to streamline reference sales through a unique web platform. This report covers the modeling of four artifacts: Use Case Diagram (stakeholder interactions), IFML Diagram (navigation flows), BPMN Diagram (business processes), and Class Diagram (system architecture). Documentation includes Kroki pages (text files in Kroki directory) and PNG images (Designs directory), supporting development with UML, IFML, and BPMN.

Modeling Process Overview

The process mapped requirements (FR1–FR5, NFR1–NFR4) to models using tools like Visual Paradigm, WebRatio, Camunda, and Enterprise Architect. Kroki pages enabled flexible navigation, and PNGs provided static visuals. Models were validated through stakeholder reviews and prototyping, ensuring traceability and alignment with project goals.

Documentation Strategy

- Kroki Directory: Contains text files (use_case.kroki, ifml.kroki, bpmn.kroki, class.kroki) in PlantUML/Mermaid syntax for interactive diagram rendering.

- Designs Directory: Stores PNGs (use_case.png, ifml.png, bpmn.png, class.png) for visual reference. This dual approach supports dynamic exploration and formal documentation.

Use Case Diagram

Objective: Capture interactions for functional requirements (FR1–FR5) and intuitive experience (UR1). Methodology: Used UML 2.5 in Visual Paradigm, defining actors (End User, Content Provider, etc.) and use cases (Search, Purchase, etc.). Created use_case.kroki and exported use_case.png. Challenges: Simplified Kroki syntax for clarity, resolved via stakeholder feedback. Outcomes: Clear visualization of interactions, aiding communication.

IFML Diagram

Objective: Model navigation for efficient access (FR1) and responsive design (UR1, UR2). Methodology: Used IFML in WebRatio, defining view containers (Home, Search) and actions (Search within 3 seconds, NFR1). Created ifml.kroki (Mermaid) and exported ifml.png. Challenges: Simplified complex IFML for Kroki, validated via prototyping. Outcomes: Guides front-end development with intuitive navigation.

BPMN Diagram

Objective: Model purchase and content submission processes (FR3, BR1). Methodology: Used BPMN 2.0 in Camunda, defining activities (Search, Approve) and gateways. Created bpmn.kroki (PlantUML) and exported bpmn.png. Challenges: Simplified BPMN gateways for Kroki, tested via rendering. Outcomes: Streamlines business workflows.

Class Diagram

Objective: Define scalable architecture (NFR2, FR1–FR5). Methodology: Used UML in Enterprise Architect, defining classes (Reference, User) and relationships. Created class.kroki and exported class.png. Challenges: Ensured Kroki supported UML relationships, validated via tests. Outcomes: Provides a scalable backend blueprint.

Tools and Techniques

Tools: WebRatio, Claude and Mermaid live editor.

Techniques: prototyping, iterative validation.

Challenges and Mitigations

Challenges: Kroki syntax complexity, stakeholder alignment, file organization. Mitigations: Tested Kroki rendering, conducted reviews, used clear file naming.

Validation and Verification

Validated via stakeholder reviews, prototyping (IFML navigation), and Kroki rendering tests. Minor IFML revisions ensured requirement alignment.

Conclusion

The process produced four artifacts, documented via Kroki pages and PNGs, supporting a scalable, user-friendly platform. Stakeholder engagement and validation ensured success.