

Automated Unit Testing of Solidity Smart Contracts in an Educational Context

Batuhan Erden

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Chair of Software Engineering for Business Information Systems (sebis)
Department of Computer Science
School of Computation, Information and Technology (CIT)
Technical University of Munich (TUM)
www.matthes.in.tum.de

Motivation

Smart Contract Development Tools

Methodology

Research Questions

Timeline

The aim of the project is to develop a reliable and efficient service for unit testing student homework in the Blockchain-based Systems Engineering course using smart contracts.

- Reliable system to efficiently test the smart contract inputs of the students
- There is growth in the use of smart contracts
- Potential to impact a wide range of industries and applications



Smart Contract Development Tools

The software frameworks or platforms that facilitate the development, deployment, and testing of smart contracts on blockchain platforms.



Hardhat



... and possibly more!

Methodology

1) Literature Review

2) Requirements & Problem Analysis



Hardhat



3) Local Setup & Development



python™



4) Remote Deployment & Data Storage



5) Scalability

 RabbitMQ



6) Security & Stability

7) Evaluation

Research Questions – Research Question 1

RQ01: What are the requirements for educational unit testing?

- a) What is the core use case?
- b) What are exemplary exercises that we would like students to do?

Research Questions – Research Question 2

RQ02: What is the status quo in automated smart contract testing?

- a) Are there examples of smart contract testing as a service?
- b) Which tools are most commonly used for smart contract testing?
- c) How can we characterize those tools in terms of their key features and performance measurement capabilities?

Research Questions – Research Question 3

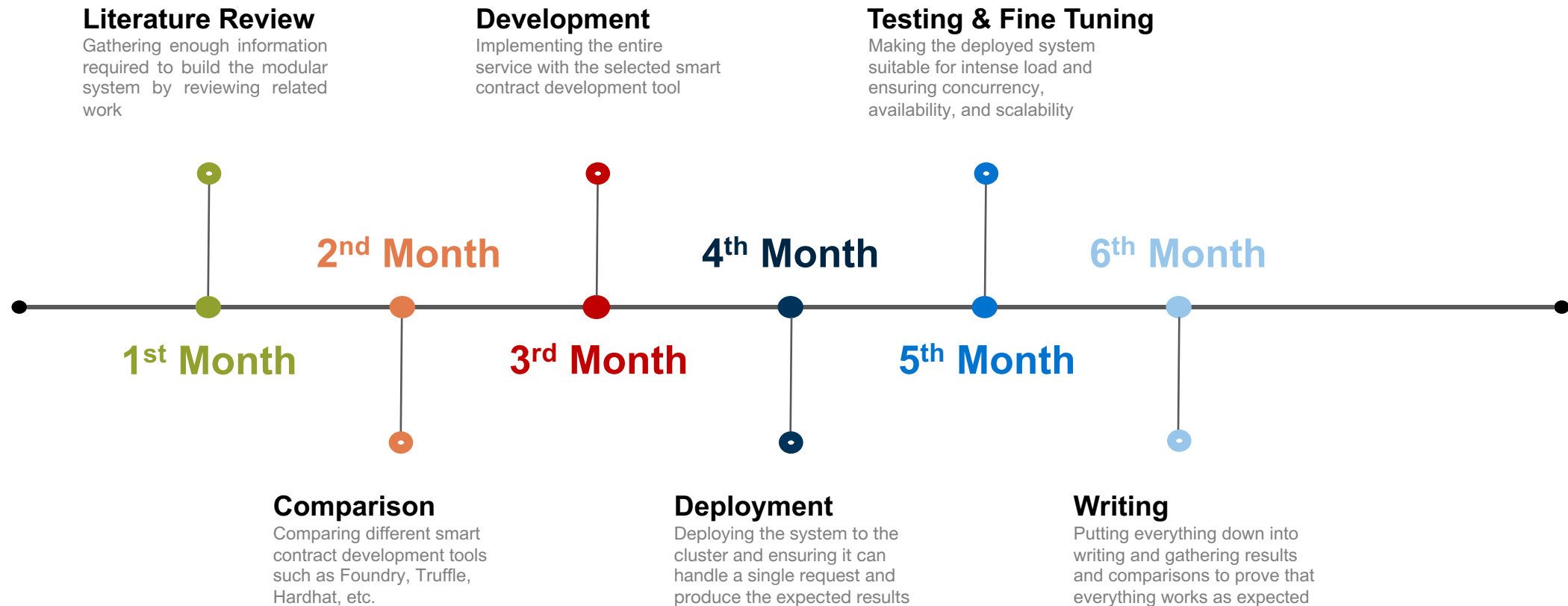
RQ03: What do we have to consider regarding security and stability when using a testing tool in a way that is not entirely intended?

- a) How can errors and crashes in the contract execution be handled?
- b) What measures do we need to take to prevent accidental or intentional system overload?

Research Questions – Research Question 4

RQ04: How can a learning platform giving feedback through automated smart contract unit testing be developed?

a) What considerations need to be made to ensure the service is scalable and expandable?





Any Questions?

