CardanoJ – By Udai Solanki

Scope Document

Problem Statement: Java Developers without Haskell experience need to spend lot of time in learning Haskell before they can build dApps on Cardano.

Solution Summary: Create a library for Java developers to write off-chain code in Java, so they can write dApp faster.

Max Duration: 6 Months, Need to complete within this period from start date.

Starting From: March 2024

Open Source: Yes, It is full Open source project hosted on github community platform.

Solution Description:

The Idea

CadanoJ will provide Java developers with APIs to write entire off-chain code for their dApps in Java.

For the Java Programmers Community

For Java developers, it means instead of spending weeks or even months learning advanced Haskell, they can now build dApps in days.

Background

Java Developers interested to learn and develop dApps on Cardano.
To encourage them, we are starting to build tools for Java Developers. This is first tool for Java developer to write off-chain code for dApps.

CardanoJ

The CardanoJ library will have core functionalities that enable developers to:

- Compose datums and redeemers, which are used in transactions that interact with Plutus script
- Query and deserialize datums and redeemers to Java object
- Build transactions to interact with Plutus script
- Stake ADA locked in Plutus scripts to designated pools
- Test different use cases and scenarios on a local chain
- Deploy Plutus scripts to testnet and mainnet

Apart from core functionalities, we will also create two end-to-end educational dApps that can be directly deployed to testnet or mainnet. The dApps will be similar to the ones in Plutus pioneer program, but with all off-chain code written in Java.

Milestones and Timelines:

Milestone 1

Timeline: Month 1 and 2

Description:
Core Plutus APIs in Java : Developing Main Building Blocks

Deliverables/Output:

- Serialization and deserialization for datum and redeemer
- Transaction builder that supports script transactions
- Automatic fee estimation for script transactions
- Stake delegation for funds locked in Plutus scripts

Acceptance criteria: CadanoJ code and documentation published on Github, accessible to the public.

Milestone 2:

Timeline: Month 3

Description:
Core Plutus APIs in Java: This milestone provides all necessary Java API documentation for developers to create script transactions.

Deliverables/Output: API documentations

Acceptance criteria: CadanoJ API published on Github, accessible to the public.

Milestone 3:

Timeline: Month 4 and 5

Description:
Plutus Java SDK: This milestone provides toolings for developers to create, test, and manage their projects in shorter amount of time.

Deliverables/Output:

- Helper functions for dApp environment setup and simulation
- Command line interface (CLI) that launches and manages local testnet
- CLI that bootstraps dApp projects
- CLI that creates and manages wallets
- CLI that builds and tests dApps
- CLI that deploys Plutus scripts to blockchain

Acceptance criteria: CadanoJ SDK and documentation published on Github, accessible to the public.

Final Milestone:

Timeline: Month 6

Description:
Educational dApps: This milestone introduces the Java library to a broader audience by showing how to use the library in real working dApps.

Deliverables/Output:

- Two end-to-end full stack dApps
- Backend built on the APIs and SDK from previous milestones
- Frontend webApp where users will be able to use light browser wallet to use the dApp
- Comprehensive documentations on the designs and architectures for the dApps
- Detailed blog posts about building

And Final Closing Report.

Acceptance criteria: CadanoJ code, SDK and API documentation published on Github, accessible to the public. Closing Report Published.

Budget: To be discussed

References:

1. https://github.com/pycardano/pycardo/tree/development , similar library created for Python.
2. https://github.com/input-output-hk/plutus-pioneer-program , Plutus is a programming language for Cardano Blockchain
3. https://www.haskell.org/ , another programming language used in Cardano Blockchain