

Integrating Layer-2 Blockchain Protocols in Reputation-Based Networks

07-300 First Technical Milestone Report

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1 Specific Items

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2 What I Have Accomplished So Far

I have started to familiarize myself with the basics of how to use Rust in Solana's on-chain programs and test suites. I have documented the structure and format of Solana smart contracts, such as its entrypoints, transactions, and instructions, by studying various examples [2] [3]. I have also set up local development clusters to be able to run and test these example smart contracts.

In terms of the prototype that I will be developing, I identified an API through the Solana program library, the Token Program, which is used to create and mint tokens on Solana's blockchain [1]. I drafted a preliminary smart contract, in which I aimed to use this API to develop the prototypes for three primitives - creating, minting, and transferring ZUZ. However, this API does not support the full scope of ZUZ specifications, so I will have to revise these prototypes to handle transactions and instructions at a lower level.

3 Reflection on Initial Plan

3.1 Major changes

Although the details of the ledger implementation will be fleshed out as I develop the prototype, there are no major changes to the goals of the project, which are to integrate layer-2 blockchain protocols to the BoLT ledger and comparatively assess its performance and flexibility.

3.2 Meeting my milestone

Although I have been working towards a prototype of the smart contract as described in the original project proposal, I have not met the aforementioned milestone. Since a preliminary survey of the Solana program library did not support the on-chain functionality that we needed, I will need to develop this contract at a lower level. This will require me to become more proficient in the Rust programming language, specifically in the context of Solana's on-chain program development. My research mentor has advised that I build up this understanding by first implementing an ERC-20 token from scratch on Solana's blockchain and adapting this functionality to the ZUZ implementation.

3.3 Surprises

There have not been any major surprises, other than the fact that I will have work at a lower level sooner than I expected to. There will be a steep learning curve to build up to a prototype of the ZUZ ledger.

3.4 Revisions to 07-400 milestones

I will need to revise my initial few milestones, as I will be working on an implementation of an ERC-20 token on the Solana blockchain in order to work up to an implementation of ZUZ. I expect that once I am able to implement the first three primitives for the ZUZ ledger that the remaining primitives will follow in a relatively straightforward fashion. As of right now, it still seems reasonable that I will be able to deploy to the mainnet by March 15th for my fourth milestone.

More specifically, I am revising my first milestone to be a finished implementation of the ERC-20 token. The second milestone will be to adapt the ERC-20 token implementation for a ZUZ implementation which supports the six primitives outlined in the original project proposal for the first milestone. The third milestone will be to implement the remaining primitives which are spread between the second and third milestones in the original proposal.

3.5 Resources needed

At this point, I have all the necessary resources to continue with local development, and I have a plan to get resources, such as AWS EC2 instances and access to the BoLT backend, once I begin testing and running experiments.

References

- [1] Solana Program Library API. URL: <https://michaelhly.github.io/solana-py/spl.html>.
- [2] Solana Program Library Docs. URL: <https://spl.solana.com/>.

[3] Solana-Labs. Hello World on Solana. URL: <https://github.com/solana-labs/example-helloworld>.