AyA Listener Committee and Event Processing: Current State and Future Tasks

Your Name

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1 Introduction

The Listener Committee (LC) in AyA is a subset of the permissioned Validators, responsible for listening and processing events occurring on connected blockchains. Validators run a dedicated Chain-Follower for each connected chain. Chain-Followers are independent binaries interfacing via an RPC API with the AyA CF Indexer, a component in the AyA Node.

Currently, the Chain-Follower pushes events directly to the Priority Queue RPC on the AyA Node. The system processes these events and ensures their timely inclusion in the blockchain. However, certain components and functionalities need to be implemented or improved.

2 System Context Diagram

3 Current State

3.1 Chain-Follower

Current State: - Observes events on connected blockchains. - Although the followers contacts the RPC Does not yet pushes events to the Priority Queue RPC on the AyA Node. The command for the queue is to be addressed.

Future Tasks: - Implement more robust event observation and validation mechanisms. - Ensure timestamp and block number checks are accurately performed.

3.2 Priority Queue RPC

Current State: - Acts as an ordered cache for events. - Validates event metadata and inserts events into the queue.

Future Tasks: - Enhance metadata validation to ensure integrity. - Improve event ordering and handling edge cases.

3.3 Offchain Worker

Current State: - Pulls events from the queue and processes them.

Future Tasks: - Optimize event processing logic. - Ensure timely processing and reduce latency. - Security, encoding?

3.4 Validator

Current State: - Checks events in the queue. - Creates inclusion transactions and submits them to the AyA network.

Future Tasks: - Implement comprehensive event validation. - Enhance transaction creation and submission processes.

3.5 KV Store (Alternative)

Current State: - Not implemented.

Future Tasks: - Develop a KV store for storing cross-chain events. - Implement a garbage collector to clean up the KV store after transactions are included in the ledger.

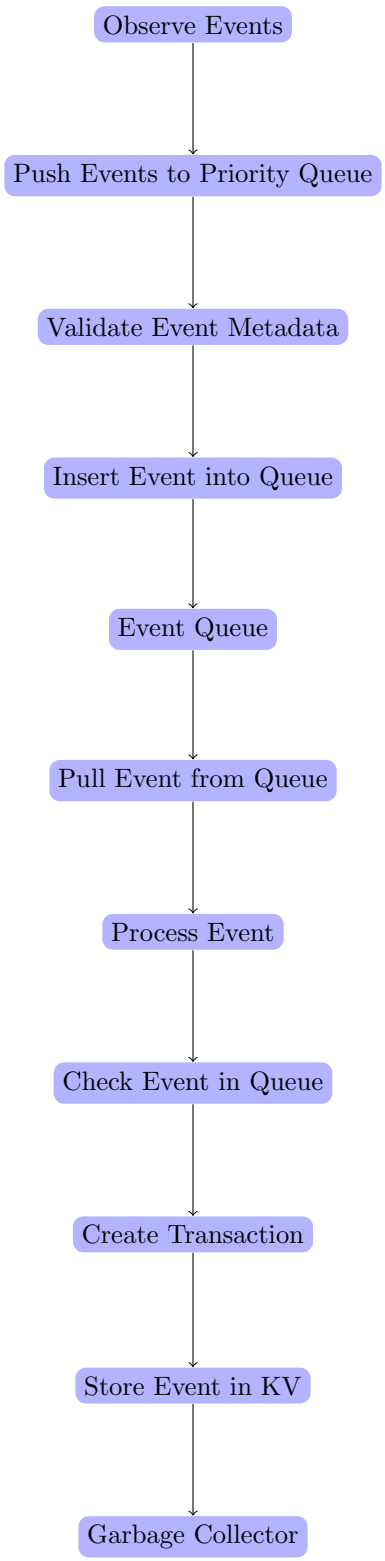

Figure 1: System Context Diagram

4 Epoch Session Manager

Current State: - Developed by a partner but lacks functionality to trigger the rotation.

Future Tasks: - Integrate the Epoch Session Manager with the AyA Node. - Implement the functionality to trigger the rotation of the Listener Committee.

5 Listener Committee

Current State: - Responsible for observing and processing cross-chain-events.

Future Tasks: - Ensure ordered and deterministic event processing. - Develop and implement the Leader selection process.

5.1 Leader Selection

Current State: - Not fully implemented.

Future Tasks: - Use a verifiable random function to select the next Leader-Set. - Implement the process to determine and reveal the next Leader-Set with each inclusion transaction.

6 Randomness

Current State: - Not fully implemented.

Future Tasks: - Create a Random-Seed-Merkle-Tree at the beginning of each epoch. - Commit the Merkle Root on-chain with a transaction to ensure immutability and prevent manipulation.