

# Assessment of AyA System Implementation Progress

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## 1 Introduction

This document provides an assessment of the current progress in the implementation of the AyA system based on the detailed requirements provided. Each key component is evaluated, and recommendations are offered for further development.

## 2 Assessment of Progress

### 2.1 Listener Committee and Chain-Followers

Implementation of Chain-Followers that listen to events on connected blockchains and push these events to the AyA CF Indexer. **Progress:** Partial implementation evident, with functions to handle incoming events, though full functionality for timely ordered processing needs confirmation.

### 2.2 AyA CF Indexer

Management of the CCE Inbox for unprocessed cross-chain events. **Progress:** Functional capabilities to fetch and store events are present; however, the verification and transition process to the Mempool is not fully outlined.

### 2.3 Inbox Worker

Automated processing and verification of events per block are required. **Progress:** Implementation details are lacking, indicating a need for development in this area.

### 2.4 Cross Chain Event Mempool

Stores verified events awaiting inclusion in the AyA ledger. **Progress:** Conceptually recognized, but lacks detailed implementation within the Substrate framework.

## 2.5 Epoch Session Manager and Listener Committee Rotation

Handles epoch changes and the rotation of the Listener Committee. **Progress:** Not implemented, and essential for managing the Listener Committee’s operational dynamics.

## 2.6 Leader-Set and Leader Selection

Processes for selection and responsibilities of the Leader and Leader-Set need clarification and implementation. **Progress:** Critical for event inclusion transaction management but remains undeveloped.

## 2.7 Randomness and Security

Current limitations with randomness implementation necessitate potential enhancements. **Progress:** Needs investigation and enhancement to support verifiable randomness effectively.

## 2.8 System Integration and Testing

Comprehensive integration and testing are required to ensure system operability. **Progress:** Foundational elements are in development; however, integration and end-to-end testing are required.

# 3 Recommendations

- **Implement the Epoch Session Manager:** Essential for managing epoch transitions and Listener Committee rotations.
- **Detail and Develop Leader Selection:** Ensure transparent, verifiable processes integrated within the system.
- **Enhance Randomness Solutions:** Explore more robust mechanisms for generating verifiable randomness.
- **System Integration Testing:** Conduct rigorous testing phases to ensure the system operates as expected under various conditions.

# 4 Conclusion

While the foundational work has been initiated, substantial development, integration, and testing efforts are needed to fully realize the AyA system capabilities as per the project specifications.