

Test Report Title: Sonic HyperGrid Integrated Demo Project Testing Report

1. Report Overview

- Project Name: Sonic HyperGrid Integrated Demo
- Testing Period: May 6, 2024, to May 9, 2024
- Purpose of Testing:  
Perform thorough testing to validate the functionality, security, and performance of the read-write synchronization mechanism, including unit testing, integration testing, and real-world simulation testing.  
The test will be focusing on two parts:  
(1) The correctness of the state syncing, for instance the non-existence state sync, the out-date-state syncing, the existing data override, etc.  
(2) The performance of the state syncing, using timestamp or similar metrics to measure the normal transaction without accessing the base layer data and transaction accessing the base layer data.

2. Test Environment

- Hardware Environment: 32-core CPU, 64GB RAM, 1T SSD
- Software Environment: Ubuntu 22.04 LTS OS

3. Testing Strategy

- Unit Testing: Focus on individual components or modules.
- Integration Testing: Focus on combined parts of the application to determine if they function together correctly.
- Real-World Simulation Testing: Testing the application in a simulated real-world environment.

4. Unit Testing Results:

Test ID	Test Category	Description	Expected Result	Actual Result
T101	correctness	Pulling Sonic NFT contract from Base Layer to Sonic HyperGrid cache	Operation should complete normally	Log printed confirming successful operation
T102	correctness	Verify Sonic NFT contract pulled into Sonic HyperGrid cache	Sonic NFT contract data structure complete and consistent	Log printed confirming data integrity and consistency successful
T103	correctness	Execute mint operation on Sonic NFT contract pulled into Sonic HyperGrid cache	Sonic NFT successfully minted	Log printed confirming successful operation, blockchain transaction record found in browser
T104	correctness	Verify the data integrity of the Token minted from the Sonic NFT contract in Sonic HyperGrid cache	Sonic NFT Token data structure is complete	Log printed confirming data structure completeness, blockchain data record found in browser
T105	correctness	Modify Account data on Base Layer through Sonic HyperGrid	Operation to modify data should complete normally	Log printed confirming successful operation, blockchain transaction record found in browser
T106	correctness	Verify modification of Account data on Base Layer through Sonic HyperGrid	Account data structure is complete	Log printed confirming successful operation, blockchain transaction record found in browser
T107	performance	Time taken to pull Sonic NFT contract to Sonic HyperGrid cache (repeated and recorded 100 times)	None	Max time: 307ms, Min time: 112ms, Avg time: 185ms
T108	performance	Time taken to modify Account data on Base Layer through Sonic HyperGrid (repeated and recorded 100 times)	None	Max time: 738ms, Min time: 349ms, Avg time: 471ms

5. Integration Testing Results:

Test ID	Test Category	Description	Expected Result	Actual Result
T201	correctness	Compilation of Sonic HyperGrid Node program code	Successful compilation	No errors
T202	correctness	Operation of Sonic HyperGrid Node program	Sonic HyperGrid Node program can start normally	Does not exit unexpectedly
T203	correctness	Deployment of Sonic NFT contract	Contract can be successfully deployed and deployment result can be queried	Compatible with official clients or third-party tools in the Solana ecosystem (such as Playground) for program deployment
T204	correctness	Fetching Sonic NFT contract from Base Layer via RPC on Sonic HyperGrid and executing mint operation	Sonic NFT is successfully minted	Program prints logs verifying the operation's success; browser queries show blockchain transaction records

T205	correctness	Modifying the value of a Sonic NFT Token on the Base Layer via RPC call on Sonic HyperGrid	Successful modification of data, Sonic NFT Token data structure remains intact	Program prints logs verifying the operation's success; browser queries show blockchain transaction records
T206	performance	Monitoring the time consumed to fetch and mint Sonic NFT contract via RPC on Sonic HyperGrid (100 times)	None	Maximum time: 351ms, Minimum time: 137ms, Average time: 212ms
T207	performance	Monitoring the time consumed to modify a Sonic NFT Token value via RPC on Sonic HyperGrid (100 times)	None	Maximum time: 794ms, Minimum time: 390ms, Average time: 516ms