

1 Known Issues and Limitations

During the development and testing phases of the dApp, several known issues and limitations were identified. These are discussed in the following sections:

1.1 Known Issues

1. **Error Handling in Transactions:** `Backend.js` interactions with the Ethereum provider via `ethers.js` lack sufficient error handling. Failures in transactions or connections are not properly logged, making troubleshooting difficult.
2. **Private Key Security:** The use of private keys in `Backend.js` through environment variables poses a security risk. Misconfiguration or exposure of these keys could lead to unauthorized access and system compromise.
3. **Input Validation:** Modules like `rewards.js`, `scores.js`, and `username.js` lack proper input validation, making the application vulnerable to SQL injection and data inconsistencies.
4. **Unprotected API Endpoints:** `pages.js` lacks authentication for API endpoints, allowing unauthorized users to access sensitive operations, such as score registration and wallet verification.
5. **Lack of Comprehensive Tests:** The test suite in `TokenTest.js` only covers basic functionality. No tests for negative scenarios, performance, or security vulnerabilities, leaving gaps in robustness.

1.2 Limitations

1. **Solidity Compiler Compatibility:** The smart contract `Token.sol` is written for Solidity version 0.8.24, limiting its compatibility with future versions. It also lacks advanced features like `burn` or `pause`, reducing extensibility.
2. **Reliance on MetaMask:** The dApp depends exclusively on MetaMask for blockchain interactions, limiting accessibility for users without MetaMask. No fallback mechanisms are in place to support other wallets.
3. **Gas Costs and Scalability:** The dApp is subject to Ethereum's fluctuating gas fees, which may hinder usability during network congestion. No optimization mechanisms are present to reduce gas consumption.
4. **NFT Trading Not Implemented:** The dApp includes a section for buying and selling NFTs, but this feature has not yet been implemented, limiting the dApp's current scope.