CERTIK

Security Assessment

CluCoin

May 25th, 2021

Summary

This report has been prepared for CluCoin smart contracts, to discover issues and vulnerabilities in the source code of their Smart Contract as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Dynamic Analysis, Static Analysis, and Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases given they are currently missing in the repository;
- Provide more comments per each function for readability, especially contracts are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

Overview

Project Summary

Project Name	CluCoin
Description	A SafeMoon fork with additional launch restrictions.
Platform	BSC
Language	Solidity
Codebase	https://github.com/CluCoinInc/CluCoin
Commits	1. ecb58704744d93383705b74d16ff16a03be07f93 2. 466bc65b30846f23931dfdb0197959f33f64d076

Audit Summary

Delivery Date	May 25, 2021
Audit Methodology	Static Analysis, Manual Review
Key Components	CluShare.sol, CluCoin.sol

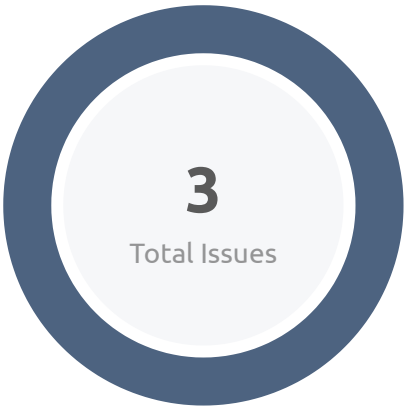
Vulnerability Summary

Total Issues	3
Critical	0
Major	0
Minor	0
Informational	3
Discussion	0

Audit Scope

ID	file	SHA256 Checksum
CSC	CluShare.sol	b24381d8cfe92d0f4b1082e22f95e6e078203bc5e12101071310aaf651bdb489

Findings



Critical	0 (0.00%)
Major	0 (0.00%)
Minor	0 (0.00%)
Informational	3 (100.00%)
Discussion	0 (0.00%)

ID	Title	Category	Severity	Status
CSC-01	Unlocked Compiler Version	Language Specific	Informational	Resolved
CSC-02	Redundant Variable Initialization	Coding Style	Informational	Resolved
CSC-03	Order of Layout	Coding Style	Informational	Resolved

CSC-01 | Unlocked Compiler Version

Category	Severity	Location	Status
Language Specific	Informational	CluShare.sol: 10	Resolved

Description

The contract has unlocked compiler version. An unlocked compiler version in the source code of the contract permits the user to compile it at or above a particular version. This, in turn, leads to differences in the generated bytecode between compilations due to differing compiler version numbers. This can lead to an ambiguity when debugging as compiler specific bugs may occur in the codebase that would be hard to identify over a span of multiple compiler versions rather than a specific one.

Recommendation

We advise that the compiler version is instead locked at the lowest version possible that the contract can be compiled at. For example, for version `v0.6.2` the contract should contain the following line:

```
pragma solidity 0.6.2;
```

Alleviation

The development team opted to consider our references and locked the compiler to version `0.6.5`.

CSC-02 | Redundant Variable Initialization

Category	Severity	Location	Status
Coding Style	Informational	CluShare.sol: 692	Resolved

Description

All variable types within Solidity are initialized to their default "empty" value, which is usually their zeroed out representation. Particularly:

- `uint` / `int`: All `uint` and `int` variable types are initialized at `0`
- `address`: All `address` types are initialized to `address(0)`
- `byte`: All `byte` types are initialized to their `byte(0)` representation
- `bool`: All `bool` types are initialized to `false`
- `ContractType`: All contract types (i.e. for a given `contract ERC20 {}` its contract type is `ERC20`) are initialized to their zeroed out address (i.e. for a given `contract ERC20 {}` its default value is `ERC20(address(0))`)
- `struct`: All `struct` types are initialized with all their members zeroed out according to this table

Recommendation

We advise that the linked initialization statements are removed from the codebase to increase legibility.

Alleviation

The development team opted to consider our references and removed the redundant initialization statement.

CSC-03 | Order of Layout

Category	Severity	Location	Status
Coding Style	Informational	CluShare.sol: 810~828	Resolved

Description

The order of layout in the `CluCoin` contract does not follow the Solidity style guide.

Recommendation

We advise to re-arrange the layout of the linked contract.

Alleviation

The development team opted to consider our references and moved the `launchRestrict` modifier implementation above the constructor, closely following the Solidity style guide.

Appendix

Finding Categories

Gas Optimization

Gas Optimization findings do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

Mathematical Operations

Mathematical Operation findings relate to mishandling of math formulas, such as overflows, incorrect operations etc.

Logical Issue

Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Control Flow

Control Flow findings concern the access control imposed on functions, such as owner-only functions being invoke-able by anyone under certain circumstances.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Data Flow

Data Flow findings describe faults in the way data is handled at rest and in memory, such as the result of a struct assignment operation affecting an in-memory struct rather than an in-storage one.

Language Specific

Language Specific findings are issues that would only arise within Solidity, i.e. incorrect usage of private or delete.

Coding Style

Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

Inconsistency

Inconsistency findings refer to functions that should seemingly behave similarly yet contain different code, such as a constructor assignment imposing different require statements on the input variables than a setter function.

Magic Numbers

Magic Number findings refer to numeric literals that are expressed in the codebase in their raw format and should otherwise be specified as constant contract variables aiding in their legibility and maintainability.

Compiler Error

Compiler Error findings refer to an error in the structure of the code that renders it impossible to compile using the specified version of the project.

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