CERTIK

Code Security Assessment

Chain - XCN Token

Mar 6th, 2022

Table of Contents

Summary

This report has been prepared for Chain - XCN Token to discover issues and vulnerabilities in the source code of the Chain - XCN Token project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing 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;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

Overview

Project Summary

Project Name	Chain - XCN Token
Platform	Other
Language	Solidity
Codebase	https://github.com/chain/chain-token/
Commit	ae4a01dcd4ca74408188594a78f0aa7af21012aa

Audit Summary

Delivery Date	Mar 06, 2022
Audit Methodology	Static Analysis, Manual Review

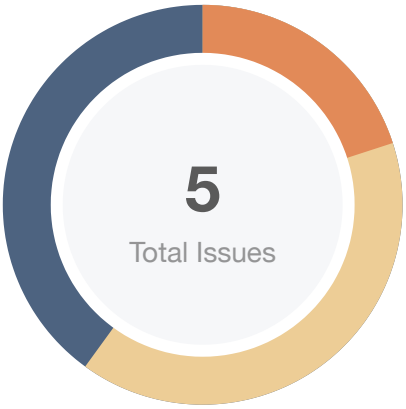
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Partially Resolved	Mitigated	Resolved
Critical	0	0	0	0	0	0	0
Major	1	0	0	1	0	0	0
Medium	0	0	0	0	0	0	0
Minor	2	0	0	1	0	0	1
Informational	2	0	0	0	0	0	2
Discussion	0	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
XCN	XCN-Token.sol	f1561b9fecf66a373c3fcdc21eb159f4f7063a025079c3f6d268e0bdd57724a8

Findings



Critical	**0** (0.00%)
Major	**1** (20.00%)
Medium	**0** (0.00%)
Minor	**2** (40.00%)
Informational	**2** (40.00%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
XCN-01	Initial Token Distribution	**Centralization / Privilege**	**Major**	Acknowledged
XCN-02	Unlocked Compiler Version	Language Specific	Informational	Resolved
XCN-03	Fork Leftovers	Volatile Code	Informational	Resolved
XCN-04	Delegation Not Moved Along With `mint()`	Logical Issue	Minor	Acknowledged
XCN-05	Strict Conditional	Logical Issue	Minor	Resolved

XCN-01 | Initial Token Distribution

Category	Severity	Location	Status
Centralization / Privilege	**Major**	XCN-Token.sol: 515	Acknowledged

Description

20B of the 68B max supply is sent to the contract deployer when deploying the contract. This could be a centralization risk as the deployer can distribute `XCN` tokens without obtaining the consensus of the community.

Recommendation

We recommend the team to be transparent regarding the initial token distribution process, and the team shall make enough efforts to restrict the access of the private key.

XCN-02 | Unlocked Compiler Version

Category	Severity	Location	Status
Language Specific	Informational	XCN-Token.sol: 1	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 different compiler versions. 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 `v0.5.2` the contract should contain the following line:

```
pragma solidity 0.5.2;
```

Alleviation

The team heeded our advice and updated the code in commit [c28e462d8ad31efd7561905e609907e151b53b0d](c28e462d8ad31efd7561905e609907e151b53b0d).

XCN-03 | Fork Leftovers

Category	Severity	Location	Status
Volatile Code	Informational	XCN-Token.sol: 554~556	Resolved

Description

The linked error messages use `COMP` as the project name, which is fork leftover.

```
554         require(signatory != address(0), "Comp::delegateBySig: invalid signature");
555         require(nonce == nonces[signatory]++, "Comp::delegateBySig: invalid nonce");
556         require(now <= expiry, "Comp::delegateBySig: signature expired");
```

Recommendation

We recommend using `XCN` as the project name to avoid misleading.

Alleviation

The team heeded our advice and updated the code in commit [c28e462d8ad31efd7561905e609907e151b53b0d](c28e462d8ad31efd7561905e609907e151b53b0d).

XCN-04 | Delegation Not Moved Along With `mint()`

Category	Severity	Location	Status
Logical Issue	Minor	XCN-Token.sol: 517	Acknowledged

Description

Since the token here is a Governance token, the voting power of delegation should be addressed with the token flow (i.e., when `mint` and `transfer`/`transferFrom` functions are triggered). However, the current `mint()` implementation does not update the `delegate` (i.e., invoking `_moveDelegates()`).

Recommendation

Consider adding call of `_moveDelegates()` in the function `mint()`.

Alleviation

[XCN Team]:

when mint XCN, delegate voting power not added for minters in order to delegate, minters should call delegate() function after mint So this is a function rather than bug.

XCN-05 | Strict Conditional

Category	Severity	Location	Status
Logical Issue	Minor	XCN-Token.sol: 426	Resolved

Description

The linked conditional conducts a strict comparison between `value` and ChainToken balance. However, the check should be passed when `balanceOf(msg.sender)` = `value`.

Recommendation

We advise this comparison to instead become a greater-than-or-equal (`>=`) comparison.

Alleviation

The team heeded our advice and updated the code in commit [c28e462d8ad31efd7561905e609907e151b53b0d](c28e462d8ad31efd7561905e609907e151b53b0d).

Appendix

Finding Categories

Centralization / Privilege

Centralization / Privilege findings refer to either feature logic or implementation of components that act against the nature of decentralization, such as explicit ownership or specialized access roles in combination with a mechanism to relocate funds.

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.

Volatile Code

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

Language Specific

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

Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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