VRust

Security Assessment

O2Lab VRust Team

28/01/2022 18:59:11

Contents

Summary

This report has been prepared for O2Lab VRust Team to discover issues and vulnerabilities in the source code of the O2Lab VRust Team 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	O2Lab VRust Team
Platform	Ethereum
Language	Solana
Crate	locked_voter
GitHub Location	https://github.com/parasol-aser/vrust
sha256	Unknown

Audit Summary

Delivery Date	28/01/2022
Audit Methodology	Static Analysis
Key Components	

Vulnerability Summary

Vulnerability Level	Total
Critical	2
Major	0
Medium	0
Minor	0
Informational	0
Discussion	0

Findings

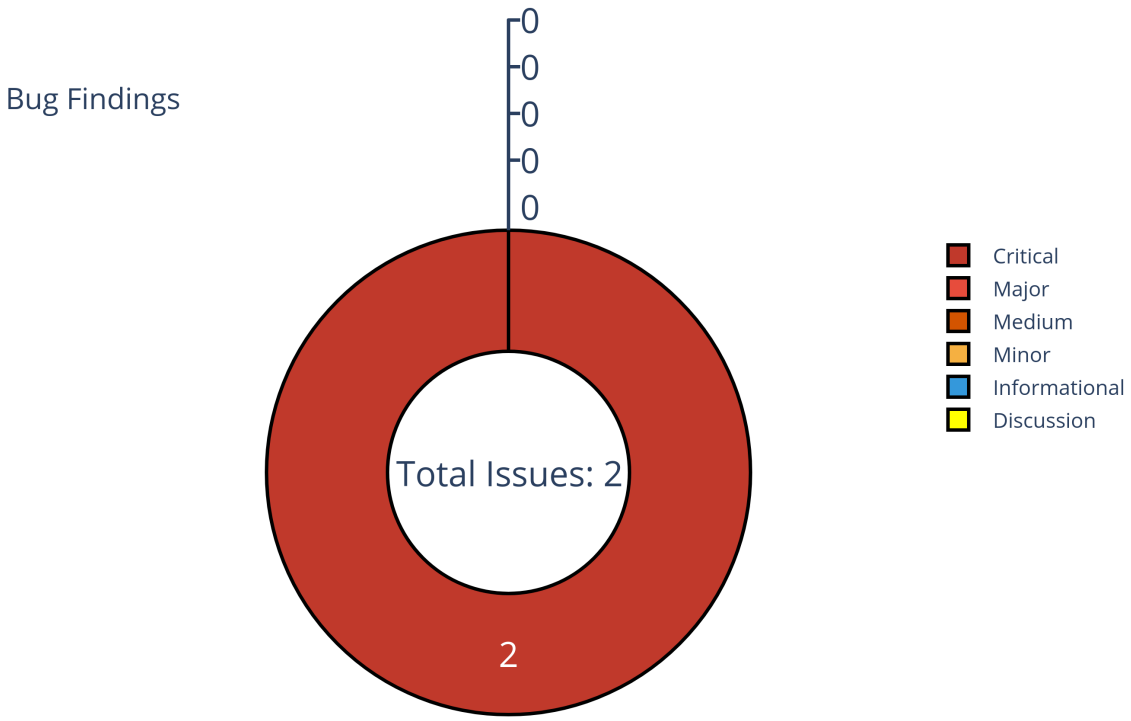

Figure 1: Findings

ID	Title	Category	Severity	Status
INT_CVE_0	Overflow	Missing Owner Check	Critical	UnResolved
INT_CVE_1	Overflow	Missing Owner Check	Critical	UnResolved

Issue: INT_CVE_0: IntegerCve - Overflow

Category	Severity	Status
Missing Owner Check	Critical	UnResolved

- Location

programs/locked-voter/src/locker.rs:9:5: 41:6

```
9  pub fn calculate_voter_power(&self, escrow: &Escrow, now: i64) ->
   ↪  Option<u64> {
10         // invalid `now` argument, should never happen.
11         if now == 0 {
12             return None;
13         }
14         if escrow.escrow_started_at == 0 {
15             return Some(0);
16         }
17         // Lockup had zero power before the start time.
18         // at the end time, lockup also has zero power.
19         if now < escrow.escrow_started_at || now >= escrow.escrow_ends_at {
20             return Some(0);
21         }
22
23         let seconds_until_lockup_expiry =
           ↪  escrow.escrow_ends_at.checked_sub(now)?;
24         // elapsed seconds, clamped to the maximum duration
25         let relevant_seconds_until_lockup_expiry =
           ↪  seconds_until_lockup_expiry
26             .to_u64()?
27             .min(self.max_stake_duration);
28
29         // voting power at max lockup
30         let power_if_max_lockup = escrow
31             .amount
32             .checked_mul(self.max_stake_vote_multiplier.into())?;
33
34         // multiply the max lockup power by the fraction of the max stake
           ↪  duration
35         let power = (power_if_max_lockup as u128)
```

```
            .checked_mul(relevant_seconds_until_lockup_expiry.into())?
            .checked_div(self.max_stake_duration.into())?
            .to_u64()?;

        Some(power)
    }

```

- Call Stack

```
programs/locked-voter/src/locker.rs
```

- description:

Description of the bug here.

- link:

GitHub Link to be added.

- alleviation:

Some alleviation steps here.

Issue: INT_CVE_1: IntegerCve - Overflow

Category	Severity	Status
Missing Owner Check	Critical	UnResolved

- Location

programs/locked-voter/src/locker.rs:9:5: 41:6

```
9  pub fn calculate_voter_power(&self, escrow: &Escrow, now: i64) ->
   ↪  Option<u64> {
10         // invalid `now` argument, should never happen.
11         if now == 0 {
12             return None;
13         }
14         if escrow.escrow_started_at == 0 {
15             return Some(0);
16         }
17         // Lockup had zero power before the start time.
18         // at the end time, lockup also has zero power.
19         if now < escrow.escrow_started_at || now >= escrow.escrow_ends_at {
20             return Some(0);
21         }
22
23         let seconds_until_lockup_expiry =
           ↪  escrow.escrow_ends_at.checked_sub(now)?;
24         // elapsed seconds, clamped to the maximum duration
25         let relevant_seconds_until_lockup_expiry =
           ↪  seconds_until_lockup_expiry
26             .to_u64()?
27             .min(self.max_stake_duration);
28
29         // voting power at max lockup
30         let power_if_max_lockup = escrow
31             .amount
32             .checked_mul(self.max_stake_vote_multiplier.into())?;
33
34         // multiply the max lockup power by the fraction of the max stake
           ↪  duration
35         let power = (power_if_max_lockup as u128)
```

```
            .checked_mul(relevant_seconds_until_lockup_expiry.into())?
            .checked_div(self.max_stake_duration.into())?
            .to_u64()?;

        Some(power)
    }

```

- Call Stack

```
programs/locked-voter/src/locker.rs
```

- description:

Description of the bug here.

- link:

GitHub Link to be added.

- alleviation:

Some alleviation steps here.

Appendix

Copied from https://leaderboard.certik.io/projects/aave

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.

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.

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.

Disclaimer

Copied from https://leaderboard.certik.io/projects/aave

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