VRust

Security Assessment

O2Lab VRust Team

26/01/2022 20:04:13

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	mango
GitHub Location	https://github.com/parasol-aser/vrust
sha256	Unknown

Audit Summary

Delivery Date	27/01/2022
Audit Methodology	Static Analysis
Key Components	

Vulnerability Summary

Vulnerability Level	Total
Critical	1
Major	0
Medium	0
Minor	0
Informational	0
Discussion	0

Findings

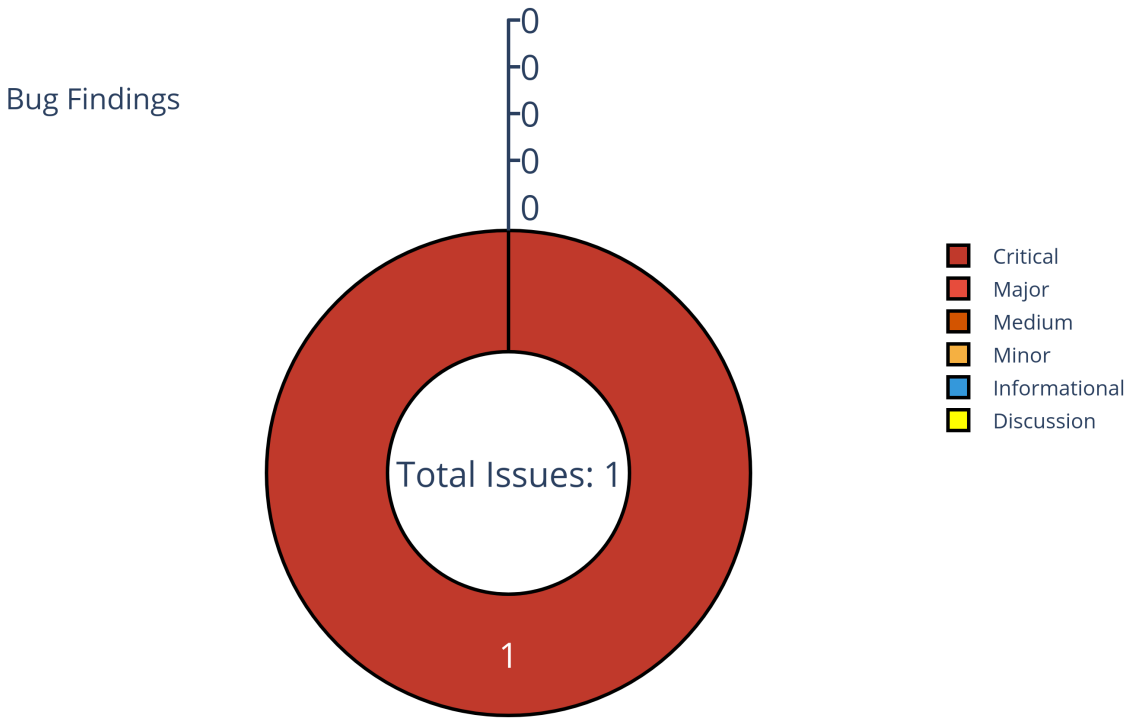

Figure 1: Findings

ID	Title	Category	Severity	Status
INT_CVE_0	Overflow	Integer Overflow wpa	Critical	UnResolved

Issue: INT_CVE_0: IntegerCve - Overflow

Category	Severity	Status
Integer Overflow wpa	Critical	UnResolved

- Location

src/state.rs:208:16: 208:44

```
208 index.last_update == curr_ts
```

- Code Context

src/state.rs:197:5: 233:6

```
1  pub fn update_indexes(&mut self, clock: &Clock) -> MangoResult<()> {
2          // TODO verify what happens if total_deposits < total_borrows
3          // TODO verify what happens if total_deposits == 0 &&
               total_borrows > 0
4          // TODO What are cases where borrows is greater than deposits?
5          // TODO total_borrows may be greater than total_deposits if
               rounding error
6
7          let curr_ts = clock.unix_timestamp as u64;
8
9          for i in 0..NUM_TOKENS {
10             let interest_rate = self.get_interest_rate(i);
11             let index: &mut MangoIndex = &mut self.indexes[i];
12             if index.last_update == curr_ts || self.total_deposits[i]
                   == ZERO_U64F64 {
13                 // TODO is skipping when total_deposits == 0 correct
                       move?
14                 continue;
15             }
16
17             // don't need to check here because this check already
                   happens in get interest rate
18             let native_deposits: U64F64 = self.total_deposits[i].
                   checked_mul(index.deposit).unwrap();
19             let native_borrows: U64F64 = self.total_borrows[i].
                   checked_mul(index.borrow).unwrap();
20             check_default!(native_borrows <= native_deposits + EPSILON)
                   ?;  // to account for rounding errors
21
22             let utilization = native_borrows.checked_div(
                   native_deposits).unwrap();
23             let borrow_interest = interest_rate
```

```
24                  .checked_mul(U64F64::from_num(curr_ts - index.
                        last_update)).unwrap();
25
26              let deposit_interest = borrow_interest
27                  .checked_mul(utilization).unwrap();
28
29              index.last_update = curr_ts;
30              index.borrow = index.borrow.checked_mul(borrow_interest).
                    unwrap()
31                  .checked_add(index.borrow).unwrap();
32
33              index.deposit = index.deposit.checked_mul(deposit_interest)
                    .unwrap()
34                  .checked_add(index.deposit).unwrap();
35          }
36          Ok(())
37      }
```

- Call Stack

```
1  src/state.rs
```

- description:

Description of the bug here.

- link:

GitHub Link to be added.

- alleviation:

Some alleviation steps here.

Appendix

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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.

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

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