VRust

Security Assessment

O2Lab VRust Team

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

Audit Summary

Delivery Date	11/04/2022
Audit Methodology	Static Analysis
Key Components	

Vulnerability Summary

Vulnerability Level	Total
Critical	5
Major	0
Medium	0
Minor	0
Informational	0
Discussion	0

Findings

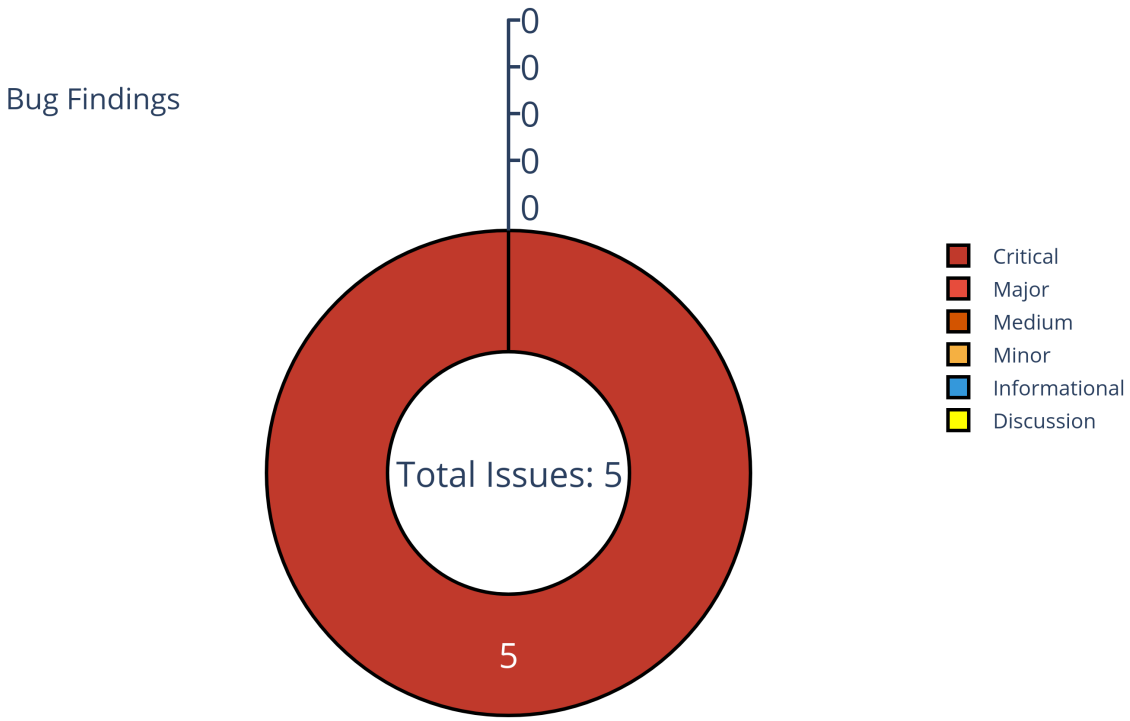

Figure 1: Findings

Finding Statistic

Category	Count
MissingKeyCheck	5

ID	Category	Severity	Status
0	MissingKeyCheck	Critical	UnResolved
1	MissingKeyCheck	Critical	UnResolved
2	MissingKeyCheck	Critical	UnResolved
3	MissingKeyCheck	Critical	UnResolved
4	MissingKeyCheck	Critical	UnResolved

Issue: 0: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

binary-oracle-pair/program/src/processor.rs:534:46: 534:77

```
534 pool_account_info.data.borrow()
535
```

- Code Context

Vulnerability at Line: 534

```
529         let pool_account_info = next_account_info(account_info_iter)?;
530         let decider_account_info = next_account_info(account_info_iter)?;
531         let clock_info = next_account_info(account_info_iter)?;
532         let clock = &Clock::from_account_info(clock_info)?;
533
534         let mut pool =
            ↪ Pool::try_from_slice(&pool_account_info.data.borrow())?;
535
536         if *decider_account_info.key != pool.decider {
537             return Err(PoolError::WrongDeciderAccount.into());
538         }
539
```

- Call Stack

```
1 fn entrypoint::process_instruction(){//
  ↪ binary-oracle-pair/program/src/entrypoint.rs:12:1: 25:2 }
2     fn processor::Processor::process_instruction(){//
      ↪ binary-oracle-pair/program/src/processor.rs:564:5: 594:6 }
3         fn processor::Processor::process_decide(){//
          ↪ binary-oracle-pair/program/src/processor.rs:523:5: 561:6 }
4
```

- description:

- link:
- alleviation:

Issue: 1: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

binary-oracle-pair/program/src/processor.rs:403:56: 403:98

```
403 token_pass_user_account_info.data.borrow()
404
```

- Code Context

Vulnerability at Line: 403

```
398
399         if amount == 0 {
400             return Err(PoolError::InvalidAmount.into());
401         }
402
403         let user_pass_token_account =
            ↪ Account::unpack(&token_pass_user_account_info.data.borrow())?;
404         let user_fail_token_account =
            ↪ Account::unpack(&token_fail_user_account_info.data.borrow())?;
405
406         let pool = Pool::try_from_slice(&pool_account_info.data.borrow())?;
407
408
```

- Call Stack

```
1 fn entrypoint::process_instruction(){//
  ↪ binary-oracle-pair/program/src/entrypoint.rs:12:1: 25:2 }
2     fn processor::Processor::process_instruction(){//
      ↪ binary-oracle-pair/program/src/processor.rs:564:5: 594:6 }
3         fn processor::Processor::process_withdraw(){//
          ↪ binary-oracle-pair/program/src/processor.rs:380:5: 520:6 }
4
```

- description:
- link:
- alleviation:

Issue: 2: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

binary-oracle-pair/program/src/processor.rs:331:42: 331:73

```
331 pool_account_info.data.borrow()
332
```

- Code Context

Vulnerability at Line: 331

```
326
327         if amount == 0 {
328             return Err(PoolError::InvalidAmount.into());
329         }
330
331         let pool = Pool::try_from_slice(&pool_account_info.data.borrow())?;
332
333         if clock.slot > pool.mint_end_slot {
334             return Err(PoolError::InvalidSlotForDeposit.into());
335         }
336
```

- Call Stack

```
1 fn entrypoint::process_instruction(){//
  ↪  binary-oracle-pair/program/src/entrypoint.rs:12:1: 25:2 }
2     fn processor::Processor::process_instruction(){//
      ↪  binary-oracle-pair/program/src/processor.rs:564:5: 594:6 }
3         fn processor::Processor::process_deposit(){//
          ↪  binary-oracle-pair/program/src/processor.rs:308:5: 377:6 }
4
```

- description:

- link:
- alleviation:

Issue: 3: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

binary-oracle-pair/program/src/processor.rs:203:46: 203:77

```
203 pool_account_info.data.borrow()
204
```

- Code Context

Vulnerability at Line: 203

```
198         let token_fail_mint_info = next_account_info(account_info_iter)?;
199         let rent_info = next_account_info(account_info_iter)?;
200         let rent = &Rent::from_account_info(rent_info)?;
201         let token_program_info = next_account_info(account_info_iter)?;
202
203         let mut pool =
            ↪ Pool::try_from_slice(&pool_account_info.data.borrow())?;
204         // Pool account should not be already initialized
205         if pool.is_initialized() {
206             return Err(PoolError::AlreadyInUse.into());
207         }
208
```

- Call Stack

```
1 fn entrypoint::process_instruction(){//
  ↪ binary-oracle-pair/program/src/entrypoint.rs:12:1: 25:2 }
2     fn processor::Processor::process_instruction(){//
      ↪ binary-oracle-pair/program/src/processor.rs:564:5: 594:6 }
3         fn processor::Processor::process_init_pool(){//
          ↪ binary-oracle-pair/program/src/processor.rs:184:5: 305:6 }
4
```

- description:

- link:
- alleviation:

Issue: 4: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

/home/yifei/.cargo/registry/src/github.com-1ecc6299db9ec823/solana-program-1.9.9/src/account_info.rs:66:11: 66:33

```
66 self.lamports.borrow()
67
```

- Code Context

Vulnerability at Line: 66

```
65 pub fn lamports(&self) -> u64 {
66         **self.lamports.borrow()
67     }
68
```

- Call Stack

```
1 fn entrypoint::process_instruction(){//
  ↪  binary-oracle-pair/program/src/entrypoint.rs:12:1: 25:2 }
2     fn processor::Processor::process_instruction(){//
       ↪  binary-oracle-pair/program/src/processor.rs:564:5: 594:6 }
3         fn processor::Processor::process_init_pool(){//
           ↪  binary-oracle-pair/program/src/processor.rs:184:5: 305:6 }
4             fn
               ↪  solana_program::account_info::AccountInfo::<'a>::lamports(){//
               ↪  /home/yifei/.cargo/registry/src/github.com-
               ↪  1ecc6299db9ec823/solana-program-
               ↪  1.9.9/src/account_info.rs:65:5: 67:6
               ↪  }
5
```

- description:

- link:
- alleviation:

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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