



# VRust

## **Security Assessment**

O2Lab VRust Team

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## 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_governance_chat
GitHub Location	<a href="https://github.com/parasol-aser/vrust">https://github.com/parasol-aser/vrust</a>
sha256	Unknown

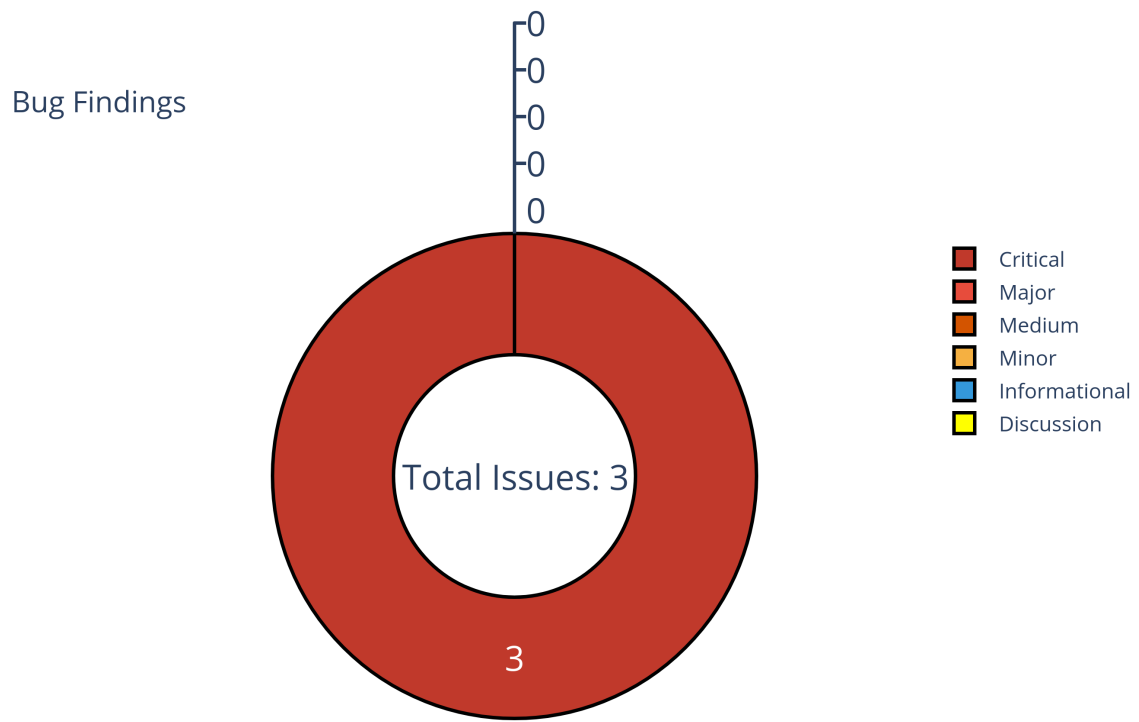
### Audit Summary

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

### Vulnerability Summary

Vulnerability Level	Total
Critical	3
Major	0
Medium	0
Minor	0
Informational	0
Discussion	0

## Findings



**Figure 1:** Findings

## Finding Statistic

Category	Count
MissingKeyCheck	3

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

**Issue: 0: MissingKeyCheck**

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

/home/yifei/open/vrust/examples2/solana-program-library/governance/program/src/state/realm.rs:298:73:  
298:97

```
298 realm_info.data.borrow()
299
```

- Code Context

Vulnerability at Line: 298

```
294 pub fn get_realm_data(
295     program_id: &Pubkey,
296     realm_info: &AccountInfo,
297 ) -> Result<RealmV2, ProgramError> {
298     let account_type: GovernanceAccountType =
299         ↪ try_from_slice_unchecked(&realm_info.data.borrow())?;
300
301     // If the account is V1 version then translate to V2
302     if account_type == GovernanceAccountType::RealmV1 {
303         let realm_data_v1 = get_account_data::<RealmV1>(program_id,
304             ↪ realm_info)?;
```

- Call Stack

```
1 fn entrypoint::process_instruction() {
  ↪ governance/chat/program/src/entrypoint.rs:11:1: 22:2 }
2 fn processor::process_instruction() {
  ↪ governance/chat/program/src/processor.rs:27:1: 43:2 }
3 fn processor::process_post_message() {
  ↪ governance/chat/program/src/processor.rs:46:1: 134:2 }
```

```
4      fn spl_governance::state::realm::get_realm_data(){  
        ↪ /home/yifei/open/vrust/examples2/solana-program-  
        ↪ library/governance/program/src/state/realm.rs:294:1: 318:2  
        ↪ }  
5
```

- description:
- link:
- alleviation:



## Issue: 1: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

/home/yifei/open/vrust/examples2/solana-program-library/governance/program/src/state/token\_owner\_record.rs:294:72

```

294 token_owner_record_info.data.borrow()
295

```

- Code Context

Vulnerability at Line: 294

```

289 pub fn get_token_owner_record_data(
290     program_id: &Pubkey,
291     token_owner_record_info: &AccountInfo,
292 ) -> Result<TokenOwnerRecordV2, ProgramError> {
293     let account_type: GovernanceAccountType =
294         try_from_slice_unchecked(&token_owner_record_info.data.borrow())?;
295
296     // If the account is V1 version then translate to V2
297     if account_type == GovernanceAccountType::TokenOwnerRecordV1 {
298         let token_owner_record_data_v1 =
299

```

- Call Stack

```

1  fn entrypoint::process_instruction() {
    ↳ governance/chat/program/src/entrypoint.rs:11:1: 22:2 }
2  fn processor::process_instruction() {
    ↳ governance/chat/program/src/processor.rs:27:1: 43:2 }
3  fn processor::process_post_message() {
    ↳ governance/chat/program/src/processor.rs:46:1: 134:2 }
4  fn
    ↳ spl_governance::state::token_owner_record::get_token_owner_record_data_f
    ↳ /home/yifei/open/vrust/examples2/solana-program-
    ↳ library/governance/program/src/state/token_owner_record.rs:340:1:
    ↳ 352:2 }

```

5

**fn**

```
↳ spl_governance::state::token_owner_record::get_token_owner_recon  
↳ /home/yifei/open/vrust/examples2/solana-program-  
↳ library/governance/program/src/state/token_owner_record.rs:289:1  
↳ 321:2 }
```

6

- description:
- link:
- alleviation:

## Issue: 2: MissingKeyCheck

Category	Severity	Status
MissingKeyCheck	Critical	UnResolved

- Location

/home/yifei/open/vrust/examples2/solana-program-library/governance/program/src/state/proposal.rs:848:35:  
848:62

```
848 proposal_info.data.borrow()
849
```

- Code Context

Vulnerability at Line: 848

```
843 pub fn get_proposal_data(
844     program_id: &Pubkey,
845     proposal_info: &AccountInfo,
846 ) -> Result<ProposalV2, ProgramError> {
847     let account_type: GovernanceAccountType =
848         try_from_slice_unchecked(&proposal_info.data.borrow())?;
849
850     // If the account is V1 version then translate to V2
851     if account_type == GovernanceAccountType::ProposalV1 {
852         let proposal_data_v1 = get_account_data::<ProposalV1>(program_id,
853             ↪ proposal_info)?;
```

- Call Stack

```
1 fn entrypoint::process_instruction() {
  ↪ governance/chat/program/src/entrypoint.rs:11:1: 22:2 }
2 fn processor::process_instruction() {
  ↪ governance/chat/program/src/processor.rs:27:1: 43:2 }
3 fn processor::process_post_message() {
  ↪ governance/chat/program/src/processor.rs:46:1: 134:2 }
4 fn
  ↪ spl_governance::state::proposal::get_proposal_data_for_governance() {
  ↪ /home/yifei/open/vrust/examples2/solana-program-
  ↪ library/governance/program/src/state/proposal.rs:924:1:
  ↪ 936:2 }
```

5

**fn**

```
↳ spl_governance::state::proposal::get_proposal_data() {  
↳ /home/yifei/open/vrust/examples2/solana-program-  
↳ library/governance/program/src/state/proposal.rs:843:1:  
↳ 905:2 }
```

6

- 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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