



# Gratitude

## Smart Contract Security Audit

February, 2021

[TechRate](#)

# Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed.

# Background

TechRate was commissioned by Gratitude to perform an audit of smart contracts:

- <https://github.com/Gratitude-GRTD/Gratitude-token/blob/main/gratitude.sol>

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

# Issues Checking Status

| No. | Issue description.   | Checking status |
|-----|--|-----------------|
| 1   | Compiler warnings.   | Passed          |
| 2   | Race conditions and Reentrancy.<br>Cross-function race conditions.   | Passed          |
| 3   | Possible delays in data delivery.  | Passed          |
| 4   | Oracle calls.  | Passed          |
| 5   | Front running.   | Passed          |
| 6   | Timestamp dependence.  | Passed          |
| 7   | Integer Overflow and Underflow.  | Passed          |
| 8   | DoS with Revert.   | Passed          |
| 9   | DoS with block gas limit.  | Passed          |
| 10  | Methods execution permissions.   | Passed          |
| 11  | Economy model. If application logic is based on an incorrect economic model, the application would not function correctly and participants would incur financial losses. This type of issue is most often found in bonus rewards systems, Staking and Farming contracts, Vault and Vesting contracts, etc. | Passed          |
| 12  | The impact of the exchange rate on the logic.  | Passed          |
| 13  | Private user data leaks.   | Passed          |
| 14  | Malicious Event log.   | Passed          |
| 15  | Scoping and Declarations.  | Passed          |
| 16  | Uninitialized storage pointers.  | Passed          |
| 17  | Arithmetic accuracy.   | Passed          |
| 18  | Design Logic.  | Passed          |

|    |                                 |        |
|----|---------------------------------|--------|
| 19 | Cross-function race conditions. | Passed |
| 20 | Safe Zeppelin module.           | Passed |
| 21 | Fallback function security.     | Passed |

# Security Issues

## High Severity Issues

No high severity issues found.

## Medium Severity Issues

No medium severity issues found.

## Low Severity Issues and Owner privileges

### 1. Add `OwnershipTransferred` event

Recommendation:

There is no `OwnershipTransferred` event in Ownable contract, it would be better, if you will add it.

### 2. Add zero address checking

Recommendation:

There is no zero address checking in functions [transfer](#) and [mint](#). It would be better to check for zero address, for preventing users from losing their funds.

### 3. Add `Transfer` event

Recommendation:

Please add a `Transfer` event inside your [constructor](#) after adding all the total supply to the `msg.sender` account.

## Conclusion

Smart contracts do not contain any high severity issues!