CERTIK

Security Assessment

Trusttoken #2

Sept 13th, 2021

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Summary

This report has been prepared for Trust Token to discover issues and vulnerabilities in the source code of the Trusttoken #2 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 codebase of the project is very well coded with proper commenting and design. It respects for the most part the language best practices and idioms.

Overview

Project Summary

Project Name	Trusttoken #2
Description	Credit System
Platform	Ethereum
Language	Solidity
Codebase	https://github.com/trusttoken/smart-contracts
Commit	d6f31eb8d8a92f2cf6302de31ebd16b7a563d319

Audit Summary

Delivery Date	Sept 13, 2021
Audit Methodology	Static Analysis, Manual Review
Key Components	

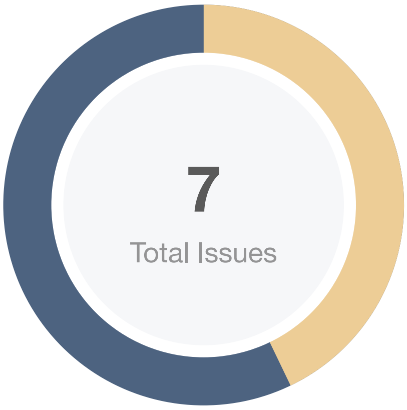
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Partially Resolved	Resolved
● Critical	0	0	0	0	0	0
● Major	0	0	0	0	0	0
● Medium	0	0	0	0	0	0
● Minor	3	0	0	0	0	3
● Informational	4	0	0	0	0	4
● Discussion	0	0	0	0	0	0

Audit Scope

ID	Repo	Commit	File	SHA256 Checksum
LFN	trusttoken/smart-contracts	d6f31eb	truefi2/LoanFactory3.sol	c36500ea860e380b2e2043031783e9400c1351cb70d84dd1073fda28a415f6fe
SBR	trusttoken/smart-contracts	d6f31eb	truefi2/SpotBaseRateOracle.sol	1cea23800d7e4a883256583c47e2174da479658e2bc537a846c5fa1e6a0216ef
TAB	trusttoken/smart-contracts	d6f31eb	truefi2/TimeAveragedBaseRateOracle.sol	e78103872f21d4d92b2569be2a70f28dc80f4ef53c758e41bbf14feab530c8b2
TCA	trusttoken/smart-contracts	d6f31eb	truefi2/TrueCreditAgency.sol	d7493e3c3bcaa373619a2ed1421f327086e72277671c4a2b5a14820b8a728eba
TFC	trusttoken/smart-contracts	d6f31eb	truefi2/TrueFiCreditOracle.sol	fc31b44832a39fc50d184eb24ac4f834bb70e9c51ac52a9c9ffce03bd26008c8
TRA	trusttoken/smart-contracts	d6f31eb	truefi2/TrueRateAdjuster.sol	12e474f2f7a3cd8c6299b2153f37863b8a7eca6a477d06130c7b7b718f96a18d

Findings



🟥 **Critical**	**0** (0.00%)
🟧 **Major**	**0** (0.00%)
🟨 **Medium**	**0** (0.00%)
🟨 **Minor**	**3** (42.86%)
🟦 **Informational**	**4** (57.14%)
🟩 **Discussion**	**0** (0.00%)

ID	Title	Category	Severity	Status
LFN-02	Ambiguous Functionality	Logical Issue	● Informational	✓ Resolved
LFN-03	Missing Zero Address Check	Logical Issue	● Minor	✓ Resolved
SBR-01	Variable Declare as Immutable	Gas Optimization	● Minor	✓ Resolved
TCA-01	Redundant Variable Initialization	Coding Style	● Informational	✓ Resolved
TCA-04	Inefficient Casting	Gas Optimization	● Informational	✓ Resolved
TFC-01	Missing Zero Address Check	Logical Issue	● Minor	✓ Resolved
TRA-01	Hardcoded Value Could Be A Constant	Coding Style	● Informational	✓ Resolved

LFN-02 | Ambiguous Functionality

Category	Severity	Location	Status
Logical Issue	● Informational	truefi2/LoanFactory3.sol: 80~82	✓ Resolved

Description

The linked function describes a external that sets the admin to a hard coded address.

Recommendation

Consider adding a rationale regarding the given functionality.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

LFN-03 | Missing Zero Address Check

Category	Severity	Location	Status
Logical Issue	● Minor	truefi2/LoanFactory3.sol: 117~120	✓ Resolved

Description

The linked code does not check against a zero address case.

Recommendation

Consider implementing a check against a zero address case.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

SBR-01 | Variable Declare as Immutable

Category	Severity	Location	Status
Gas Optimization	● Minor	truefi2/SpotBaseRateOracle.sol: 15	✓ Resolved

Description

The variable aaveLendingPool assigned in the constructor can be declared with `Immutable`. Immutable state variables can be assigned during contract creation but will remain constant throughout the lifetime of a deployed contract. A big advantage of immutable variables is that reading them is significantly cheaper than reading from regular state variables since will not be stored in storage. Still, values will directly insert the values into the runtime code.

Recommendation

We recommend using an immutable state variable for aaveLendingPool.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

TCA-01 | Redundant Variable Initialization

Category	Severity	Location	Status
Coding Style	● Informational	truefi2/TrueCreditAgency.sol: 256, 275	✓ Resolved

Description

All variable types within Solidity are initialized to their default ""empty"" value, which is usually their zeroed out representation.

Particularly:

- `uint` / `int`: All `uint` and `int` variable types are initialized at `0`
- `address`: All `address` types are initialized to `address(0)`
- `byte`: All `byte` types are initialized to their `byte(0)` representation
- `bool`: All `bool` types are initialized to `false`
- `ContractType`: All contract types (i.e. for a given `contract ERC20 {}` its contract type is `ERC20`) are initialized to their zeroed out address (i.e. for a given `contract ERC20 {}` its default value is `ERC20(address(0))`)
- `struct`: All `struct` types are initialized with all their members zeroed out according to this table

Recommendation

We advise that the linked initialization statements are removed from the codebase to increase legibility.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

TCA-04 | Inefficient Casting

Category	Severity	Location	Status
Gas Optimization	● Informational	truefi2/TrueCreditAgency.sol: 260	✓ Resolved

Description

The linked code declares a uint8 variable instead of a uint256.

Recommendation

Consider using uint256 instead of uint8 as local variables are not packed.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

TFC-01 | Missing Zero Address Check

Category	Severity	Location	Status
Logical Issue	● Minor	truefi2/TrueFiCreditOracle.sol: 133~136	✓ Resolved

Description

The linked code does not check against a zero address case.

Recommendation

Consider implementing a check against a zero address case.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

TRA-01 | Hardcoded Value Could Be A Constant

Category	Severity	Location	Status
Coding Style	● Informational	truefi2/TrueRateAdjuster.sol: 335~338	✓ Resolved

Description

The linked code contains a hardcoded value that is repeated.

Recommendation

Consider introducing a constant to represent the value.

Alleviation

The team has fixed the issue in commit up to 1f1ee7c970b57cfea8d8e3c75404ed17b78efaa7.

Appendix

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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