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# Trade Leaf Audit

**Security Assessment  
07. March, 2023**

**For**



**Tradeleaf**



**SolidProof\_io**



**@solidproof\_io**

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Version	Date	Description
1.0	25. February 2023	<ul style="list-style-type: none"><li>• Layout project</li><li>• Automated- /Manual-Security Testing</li><li>• Summary</li></ul>
1.1	7. March 2023	<ul style="list-style-type: none"><li>• Reaudit</li></ul>

## **Network**

Polygon

## **Website**

<https://tradeleaf.io/>

## **Telegram**

<https://t.me/tradeleaforg>

## **Twitter**

<https://twitter.com/tradeleaf>

## **LinkedIn**

<https://www.linkedin.com/company/tradeleaf>



## Description

Trade Leaf is a technology company driven by a team of traditional trade finance business leaders, blockchain visionaries, venture investors, and tech entrepreneurs cooperating to disrupt the conservative and bureaucratized trade finance industry.

We create, integrate, and provide institutional-grade FinTech solutions and services for all trade finance industry participants. Our goal is to cover the trillion market gap supporting SMEs and MSMEs on emerging market.

## Project Engagement

During the Date of 25 February 2023, **Trade Leaf Team** engaged Solidproof.io to audit smart contracts that they created. The engagement was technical in nature and focused on identifying security flaws in the design and implementation of the contracts. They provided Solidproof.io with access to their code repository and whitepaper.

## Logo



## Contract Link

### v1.0

- Provided as Files

### v1.1

- <https://github.com/TradeLeaf/TLF-token-smartcontracts/tree/main/contracts>
- Commit: 41441763e3f33e092cbe6becdb9f59a118e3a893

# Vulnerability & Risk Level

Risk represents the probability that a certain source-threat will exploit vulnerability, and the impact of that event on the organization or system. Risk Level is computed based on CVSS version 3.0.

Level	Value	Vulnerability	Risk (Required Action)
<b>Critical</b>	9 - 10	A vulnerability that can disrupt the contract functioning in a number of scenarios, or creates a risk that the contract may be broken.	Immediate action to reduce risk level.
<b>High</b>	7 – 8.9	A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way.	Implementation of corrective actions as soon as possible.
<b>Medium</b>	4 – 6.9	A vulnerability that could affect the desired outcome of executing the contract in a specific scenario.	Implementation of corrective actions in a certain period.
<b>Low</b>	2 – 3.9	A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective.	Implementation of certain corrective actions or accepting the risk.
<b>Informational</b>	0 – 1.9	A vulnerability that have informational character but is not effecting any of the code.	An observation that does not determine a level of risk

# Auditing Strategy and Techniques Applied

Throughout the review process, care was taken to evaluate the repository for security-related issues, code quality, and adherence to specification and best practices. To do so, reviewed line-by-line by our team of expert pentesters and smart contract developers, documenting any issues as there were discovered.

## **Methodology**

The auditing process follows a routine series of steps:

1. Code review that includes the following:
  - i) Review of the specifications, sources, and instructions provided to SolidProof to make sure we understand the size, scope, and functionality of the smart contract.
  - ii) Manual review of code, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.
  - iii) Comparison to specification, which is the process of checking whether the code does what the specifications, sources, and instructions provided to SolidProof describe.
2. Testing and automated analysis that includes the following:
  - i) Test coverage analysis, which is the process of determining whether the test cases are actually covering the code and how much code is exercised when we run those test cases.
  - ii) Symbolic execution, which is analysing a program to determine what inputs causes each part of a program to execute.
3. Best practices review, which is a review of the smart contracts to improve efficiency, effectiveness, clarify, maintainability, security, and control based on the established industry and academic practices, recommendations, and research.
4. Specific, itemized, actionable recommendations to help you take steps to secure your smart contracts.

## Used Code from other Frameworks/Smart Contracts (direct imports)

Imported packages:

```
@openzeppelin/contracts/security/ReentrancyGuard.sol  
@openzeppelin/contracts/access/AccessControl.sol  
@openzeppelin/contracts/token/ERC20/utils/SafeERC20.sol
```

```
@openzeppelin/contracts/token/ERC20/ERC20.sol  
@openzeppelin/contracts/token/ERC20/extensions/ERC20Burnable.sol  
@openzeppelin/contracts/security/Pausable.sol  
@openzeppelin/contracts/access/Ownable.sol
```

```
@openzeppelin/contracts/access/AccessControl.sol  
@openzeppelin/contracts/security/ReentrancyGuard.sol  
@openzeppelin/contracts/token/ERC20/utils/SafeERC20.sol  
@openzeppelin/contracts/token/ERC20/ERC20.sol  
./ITLFBVesting.sol
```



## Tested Contract Files

This audit covered the following files listed below with a SHA-1 Hash.

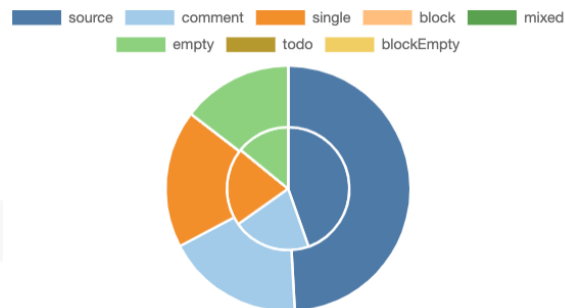
*A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.*

### v1.0

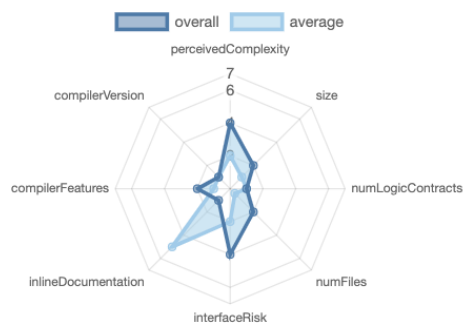
File Name	SHA-1 Hash
contracts/ ITLFLaunchpad.sol	48dab0be92f8ba36c6e818f231baf82c8ca7 e314
contracts/TLFVesting.sol	e126b35586bfdff9d825d036ff80787e6e445 674
contracts/ TLFLaunchpad.sol	da8224cf882abec23d20270663a4cbe4757 002b8
contracts/TLFToken.sol	8307c4b526a866db6b7c789b66527771d0d 373a2
contracts/ITLFVesting.sol	019a2984ae1c53be0ad03075bfd803878f1 dc8e4

# Metrics

## Source Lines v1.0



## Risk Level v1.0





# Capabilities

## Components

 Contracts	 Libraries	 Interfaces	 Abstract
3	0	2	0

### Exposed Functions

This section lists functions that are explicitly declared public or payable. Please note that getter methods for public stateVars are not included.




 Public	 Payable
55	0







External	Internal	Private	Pure	View
51	34	3	1	28

### StateVariables

Total	 Public
12	2

### Capabilities

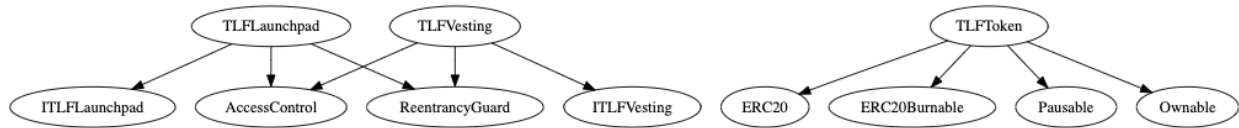
Solidity Versions observed	 Experimental Features	 Can Receive Funds	 Uses Assembly	 Has Destroyable Contracts
 0.8.18				

 Transfers ETH	 Low-Level Calls	 DelegateCall	 Uses Hash Functions	 ECRecover	 New/Create/Create2
			yes		

 TryCatch	 Unchecked

# Inheritance Graph

## v1.0





## Scope of Work/Verify Claims

The above token Team provided us with the files that needs to be tested (Github, Bscscan, Etherscan, files, etc.). The scope of the audit is the main contract (usual the same name as team appended with .sol).

We will verify the following claims:

1. Is contract an upgradeable
2. Correct implementation of Token standard
3. Deployer cannot mint any new tokens
4. Deployer cannot burn or lock user funds
5. Deployer cannot pause the contract
6. Deployer cannot set fees
7. Deployer cannot blacklist/antisnipe addresses
8. Overall checkup (Smart Contract Security)

## Is contract an upgradeable

Name	
Is contract an upgradeable?	No



## Correct implementation of Token standard

ERC20				
Function	Description	Exist	Tested	Verified
TotalSupply	Provides information about the total token supply	✓	✓	✓
BalanceOf	Provides account balance of the owner's account	✓	✓	✓
Transfer	Executes transfers of a specified number of tokens to a specified address	✓	✓	✓
TransferFrom	Executes transfers of a specified number of tokens from a specified address	✓	✓	✓
Approve	Allow a spender to withdraw a set number of tokens from a specified account	✓	✓	✓
Allowance	Returns a set number of tokens from a spender to the owner	✓	✓	✓



## Write functions of contract v1.0

- ◆ createVestingSchedule
- ◆ increaseVestingSchedule
- ◆ withdraw
- ◆ release
- ◆ revoke

- ◆ setReceiver
- ◆ initializeRound
- ◆ changeRound
- ◆ setStablecoin
- ◆ removeStablecoin
- ◆ addAccountToWhitelist
- ◆ removeAccountFromWhitelist
- ◆ buyTLF

- ◆ pause
- ◆ unpause

## Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	✓	✓	✓
Max / Total Supply	3.000.000.000		

Comments:

**v1.0**

- Owner cannot mint new tokens



## Deployer cannot burn or lock user funds

Name	Exist	Tested	Status
Deployer can lock	✓	✓	✗
Deployer cannot burn	-	-	-

Comments:

### v1.0

- Owner can lock the transfer of funds for the users by pausing the token contract

## Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer can pause	✓	✓	✗

Comments:

**v1.0**

- Owner can pause the token contract



## Deployer cannot set fees

Name	Exist	Tested	Status
Deployer cannot set fees over 25%	—	—	—
Deployer cannot set fees to nearly 100% or to 100%	—	—	—



## Deployer can blacklist/antisnipe addresses

Name	Exist	Tested	Status
Deployer can blacklist/antisnipe addresses	✓	✓	✗

Comments:

### v1.0

- Only whitelist addresses will be able to buy TLF and the owner can remove wallets from the whitelist



## Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓

### Legend

Attribute	Symbol
Verified / Checked	✓
Partly Verified	⚠
Unverified / Not checked	✗
Not available	—

# Modifiers and public functions

## v1.0

### TLFVesting.sol

- ◆ createVestingSchedule
  - Ⓜ onlyTLFAdmin
- ◆ increaseVestingSchedule
  - Ⓜ onlyVestingScheduleIsExist
  - Ⓜ onlyVestingScheduleNotRevoked
  - Ⓜ onlyTLFAdmin
- ◆ withdraw
  - Ⓜ nonReentrant
  - Ⓜ onlyOwner
- ◆ release
  - Ⓜ onlyVestingScheduleIsExist
  - Ⓜ onlyVestingScheduleNotRevoked
  - Ⓜ nonReentrant
- ◆ revoke
  - Ⓜ onlyVestingScheduleIsExist
  - Ⓜ onlyVestingScheduleNotRevoked
  - Ⓜ onlyOwner
  - Ⓜ nonReentrant

### TLFLaunchpad

- ◆ setReceiver
  - Ⓜ onlyOwner
- ◆ initializeRound
  - Ⓜ onlyOwner
- ◆ changeRound
  - Ⓜ onlyOwner
- ◆ setStablecoin
  - Ⓜ onlyOwner
- ◆ removeStablecoin
  - Ⓜ onlyOwner
- ◆ addAccountToWhitelist
  - Ⓜ onlyTLFAdmin
- ◆ removeAccountFromWhitelist
  - Ⓜ onlyTLFAdmin
- ◆ buyTLF
  - Ⓜ nonReentrant

### TLFToken.sol

- ◆ pause
  - Ⓜ onlyOwner
- ◆ unpause
  - Ⓜ onlyOwner



## Ownership Privileges:

- TLFVesting:
  - The admins address/wallet can create a new vesting schedule, and set duration, amount, to any arbitrary value.
  - Increase the vesting schedule but only
  - The owner can withdraw funds from the contract but the amount left after subtracting the vested token balance from the contracts balance
  - Revoke vesting schedule if it was set as revocable at the time of vesting creation.
  - Admin is able to release to an address with vesting schedule
- TLFLaunchpad:
  - The owner can set stable coin receiver address and change it at anytime
  - Initialise round and set startTime, duration, total amount, limit, price, vesting lock, and duration to any arbitrary value.
  - Change the initialised round, change the duration but not after the round is over, but decreasing/increasing of the duration is possible
  - It is also possible to change the total amount, and it must be more than sold amount
  - Owner can also changes the price
  - The tokens bought from the launchpad contract will vested and not be received instantly in the caller address.
- There are several authorities which are authorized to call some functions, that means, if the owner is renounced, another address is still authorized to call functions
  - Be aware of this

**Please check if an OnlyOwner or similar restrictive modifier has been forgotten.**

## Source Units in Scope v1.0

File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score
contracts/ITFLaunchpad.sol	—————	1	107	61	48	1	29
contracts/TLFVesting.sol	1	—————	318	282	142	93	99
contracts/TLFLaunchpad.sol	1	—————	373	351	182	104	121
contracts/TLFToken.sol	1	—————	29	29	22	1	24
contracts/ITLFVesting.sol	—————	1	76	46	38	1	25
<b>Totals</b>	<b>3</b>	<b>2</b>	<b>903</b>	<b>769</b>	<b>432</b>	<b>200</b>	<b>298</b>

### Legend

Attribute	Description
Lines	total lines of the source unit
nLines	normalised lines of the source unit (e.g. normalises functions spanning multiple lines)
nSLOC	normalised source lines of code (only source-code lines; no comments, no blank lines)
Comment Lines	lines containing single or block comments
Complexity Score	a custom complexity score derived from code statements that are known to introduce code complexity (branches, loops, calls, external interfaces, ...)

# Audit Results

## Critical issues

**No critical issues**

## High issues

**No high issues**

## Medium issues

**No medium issues**

## Low issues

**No low issues**

## Informational issues

Issue	File	Type	Line	Description
#1	Main	NatSpec documentation missing	—	If you started to comment your code, also comment all other functions, variables etc.

## Audit Comments

We recommend you to use the special form of comments (NatSpec Format, Follow link for more information <https://docs.soliditylang.org/en/latest/natspec-format.html>) for your contracts to provide rich documentation for functions, return variables and more. This helps investors to make clear what that variables, functions etc. do.

### 7. March 2023:

- There is still an owner (Owner still has not renounced ownership)
- Read whole report and modifiers section for more information

## SWC Attacks

ID	Title	Relationships	Status
<a href="#">SW C-1 36</a>	Unencrypted Private Data On-Chain	<a href="#">CWE-767: Access to Critical Private Variable via Public Method</a>	PASSED
<a href="#">SW C-1 35</a>	Code With No Effects	<a href="#">CWE-1164: Irrelevant Code</a>	PASSED
<a href="#">SW C-1 34</a>	Message call with hardcoded gas amount	<a href="#">CWE-655: Improper Initialization</a>	PASSED
<a href="#">SW C-1 33</a>	Hash Collisions With Multiple Variable Length Arguments	<a href="#">CWE-294: Authentication Bypass by Capture-replay</a>	PASSED
<a href="#">SW C-1 32</a>	Unexpected Ether balance	<a href="#">CWE-667: Improper Locking</a>	PASSED
<a href="#">SW C-1 31</a>	Presence of unused variables	<a href="#">CWE-1164: Irrelevant Code</a>	PASSED
<a href="#">SW C-1 30</a>	Right-To-Left-Override control character (U+202E)	<a href="#">CWE-451: User Interface (UI) Misrepresentation of Critical Information</a>	PASSED
<a href="#">SW C-1 29</a>	Typographical Error	<a href="#">CWE-480: Use of Incorrect Operator</a>	PASSED
<a href="#">SW C-1 28</a>	DoS With Block Gas Limit	<a href="#">CWE-400: Uncontrolled Resource Consumption</a>	PASSED

<a href="#">SW C-1 27</a>	Arbitrary Jump with Function Type Variable	<a href="#">CWE-695: Use of Low-Level Functionality</a>	<b>PASSED</b>
<a href="#">SW C-1 25</a>	Incorrect Inheritance Order	<a href="#">CWE-696: Incorrect Behavior Order</a>	<b>PASSED</b>
<a href="#">SW C-1 24</a>	Write to Arbitrary Storage Location	<a href="#">CWE-123: Write-what-where Condition</a>	<b>PASSED</b>
<a href="#">SW C-1 23</a>	Requirement Violation	<a href="#">CWE-573: Improper Following of Specification by Caller</a>	<b>PASSED</b>
<a href="#">SW C-1 22</a>	Lack of Proper Signature Verification	<a href="#">CWE-345: Insufficient Verification of Data Authenticity</a>	<b>PASSED</b>
<a href="#">SW C-1 21</a>	Missing Protection against Signature Replay Attacks	<a href="#">CWE-347: Improper Verification of Cryptographic Signature</a>	<b>PASSED</b>
<a href="#">SW C-1 20</a>	Weak Sources of Randomness from Chain Attributes	<a href="#">CWE-330: Use of Insufficiently Random Values</a>	<b>PASSED</b>
<a href="#">SW C-11 9</a>	Shadowing State Variables	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	<b>PASSED</b>
<a href="#">SW C-11 8</a>	Incorrect Constructor Name	<a href="#">CWE-665: Improper Initialization</a>	<b>PASSED</b>
<a href="#">SW C-11 7</a>	Signature Malleability	<a href="#">CWE-347: Improper Verification of Cryptographic Signature</a>	<b>PASSED</b>

<a href="#">SW C-11 6</a>	Timestamp Dependence	<a href="#">CWE-829: Inclusion of Functionality from Untrusted Control Sphere</a>	<b>PASSED</b>
<a href="#">SW C-11 5</a>	Authorization through tx.origin	<a href="#">CWE-477: Use of Obsolete Function</a>	<b>PASSED</b>
<a href="#">SW C-11 4</a>	Transaction Order Dependence	<a href="#">CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')</a>	<b>PASSED</b>
<a href="#">SW C-11 3</a>	DoS with Failed Call	<a href="#">CWE-703: Improper Check or Handling of Exceptional Conditions</a>	<b>PASSED</b>
<a href="#">SW C-11 2</a>	Delegatecall to Untrusted Callee	<a href="#">CWE-829: Inclusion of Functionality from Untrusted Control Sphere</a>	<b>PASSED</b>
<a href="#">SW C-11 1</a>	Use of Deprecated Solidity Functions	<a href="#">CWE-477: Use of Obsolete Function</a>	<b>PASSED</b>
<a href="#">SW C-11 0</a>	Assert Violation	<a href="#">CWE-670: Always-Incorrect Control Flow Implementation</a>	<b>PASSED</b>
<a href="#">SW C-1 09</a>	Uninitialized Storage Pointer	<a href="#">CWE-824: Access of Uninitialized Pointer</a>	<b>PASSED</b>
<a href="#">SW C-1 08</a>	State Variable Default Visibility	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	<b>PASSED</b>
<a href="#">SW C-1 07</a>	Reentrancy	<a href="#">CWE-841: Improper Enforcement of Behavioral Workflow</a>	<b>PASSED</b>
<a href="#">SW C-1 06</a>	Unprotected SELFDESTRUCT Instruction	<a href="#">CWE-284: Improper Access Control</a>	<b>PASSED</b>

<a href="#">SW</a> <a href="#">C-1</a> <a href="#">05</a>	Unprotected Ether Withdrawal	<a href="#">CWE-284: Improper Access Control</a>	<b>PASSED</b>
<a href="#">SW</a> <a href="#">C-1</a> <a href="#">04</a>	Unchecked Call Return Value	<a href="#">CWE-252: Unchecked Return Value</a>	<b>PASSED</b>
<a href="#">SW</a> <a href="#">C-1</a> <a href="#">03</a>	Floating Pragma	<a href="#">CWE-664: Improper Control of a Resource Through its Lifetime</a>	<b>PASSED</b>
<a href="#">SW</a> <a href="#">C-1</a> <a href="#">02</a>	Outdated Compiler Version	<a href="#">CWE-937: Using Components with Known Vulnerabilities</a>	<b>PASSED</b>
<a href="#">SW</a> <a href="#">C-1</a> <a href="#">01</a>	Integer Overflow and Underflow	<a href="#">CWE-682: Incorrect Calculation</a>	<b>PASSED</b>
<a href="#">SW</a> <a href="#">C-1</a> <a href="#">00</a>	Function Default Visibility	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	<b>PASSED</b>





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