Smart Contract Audit Report

for

Kalata

Version 1.0

Trustlook Blockchain Labs

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TRUSTLOOK

Project Overview

Project Name	Kalata
Contract codebase	N/A
Platform	BSC
Language	Solidity
Submission Time	2021.07.22

Report Overview

Report ID	TBL_20210724_00
Version	1.0
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Disclaimer

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About Trustlook Blockchain Labs

Trustlook Blockchain Labs is a leading blockchain security team with a goal of security and vulnerability research on current blockchain ecosystems by offering industry-leading smart contracts auditing services. Please contact us for more information at (https://www.trustlook.com/services/smart.html) or Email (bd@trustlook.com)

Trustlook blockchain laboratory has established a complete system test environment and methods.

Black-box Testing	The tester has no knowledge of the system being attacked. The goal is to simulate an external hacking or cyber warfare attack.
White-box Testing	Based on the level of the source code, test the control flow, data flow, nodes, SDK etc. Try to find out the vulnerabilities and bugs.
Gray-box Testing	Use Trustlook customized script tools to do the security testing of code modules, search for the defects if any due to improper structure or improper usage of applications.

Introduction

By reviewing the implementation of Kalata's smart contracts, this audit report has been prepared to discover potential issues and vulnerabilities of their source code. We outline in the report about our approach to evaluate the potential security risks. Advice to further improve the quality of security or performance is also given in the report.

About Kalata

Kalata is a data aggregator specially designed for DeFi for real world assets, providing customisable smart contracts to simplify the investment process of DeFi for users of all levels.

About Methodology

To evaluate the potential vulnerabilities or issues, we go through a checklist of well-known smart contracts related security issues using automatic verification tools and manual review. To discover potential logic weaknesses or project specific implementations, we thoroughly discussed with the team to understand the business model and reduce the risk of unknown vulnerabilities. For any discovered issue, we might test it on our private network to reproduce the issue to prove our findings.

The checklist of items is shown in the following table:

Category	Type ID	Name	Description
Coding Specification	CS-01	ERC standards	The contract is using ERC standards.
	CS-02	Compiler Version	The compiler version should be specified.
	CS-03	Constructor Mismatch	The constructor syntax is changed with Solidity versions. Need extra attention to make the constructor function right.
	CS-04	Return standard	Following the ERC20 specification, the transfer and approve functions should return a bool value, and a return value code

			needs to be added.
	CS-05	Address(0) validation	It is recommended to add the verification of require(_to!=address(0)) to effectively avoid unnecessary loss caused by user misuse or unknown errors.
	CV-06	Unused Variable	Unused variables should be removed.
	CS-07	Untrusted Libraries	The contract should avoid using untrusted libraries, or the libraries need to be thoroughly audited too.
	CS-08	Event Standard	Define and use Event appropriately
	CS-09	Safe Transfer	Using transfer to send funds instead of send.
	CS-10	Gas consumption	Optimize the code for better gas consumption.
	CS-11	Deprecated uses	Avoid using deprecated functions.
	CS-12	Sanity Checks	Sanity checks when setting key parameters in the system
Coding Security	SE-01	Integer overflows	Integer overflow or underflow issues.
	SE-02	Reentrancy	Avoid using calls to trade in smart contracts to avoid reentrancy vulnerability.
	SE-03	Transaction Ordering Dependence	Avoid transaction ordering dependence vulnerability.
	SE-04	Tx.origin usage	Avoid using tx.origin for authentication.
	SE-05	Fake recharge	The judgment of the balance and the transfer amount needs to use the “require function”.
	SE-06	Replay	If the contract involves the demands for entrusted management, attention should be paid to the non-reusability of verification to avoid replay attacks.
	SE-07	External call checks	For external contracts, pull instead of push is preferred.
	SE-08	Weak random	The method of generating random numbers on smart contracts requires more considerations.
Additional Security	AS-01	Access control	Well defined access control for functions.
	AS-02	Authentication management	The authentication management is well defined.
	AS-03	Semantic Consistency	Semantics are consistent.
	AS-04	Functionality checks	The functionality is well implemented.

	AS-05	Business logic review	The business model logic is implemented correctly.

The severity level of the issues are described in the following table:

Severity	**Description**
Critical	The issue will result in asset loss or data manipulations.
High	The issue will seriously affect the correctness of the business model.
Medium	The issue is still important to fix but not practical to exploit.
Low	The issue is mostly related to outedate, unused code snippets.
Informational	This issue is mostly related to code style, informational statements and is not mandatory to be fixed.

Audit Results

Here are the audit results of the smart contracts.

Scope

Following files have been scanned by our internal audit tool and manually reviewed and tested by our team:

File names	Sha1
ChainlinkOracle.sol	bab3e567aabfeffb4dc85be82aabf586754c1ac2
Collateral.sol	567ce62d3fc3d2f46ca6e4db0e15e4a93e179d05
Factory.sol	0bc83ddcc5dbfff5f4b4a72b967f61190e102fb5
KalataOracle.sol	658fb87d908986b0b17bf2a8e2b0b01f63463953
Mint.sol	5590985f6483bf9bbff354f8e4891e26c7da7e8f
Oracle.sol	228dc25de8728d7e076816944238bf75943eca64
Router.sol	c853ba9ef0a42b25c52c28540529eb829a053b97
Staking.sol	9fd1217c101ab2c93830df49df87a79012f49e55

Note that the original version of the project was audited by Certik and an audit report was provided with the release. This audit report is focused on the new update part of the new release.

Summary

Issue ID	Severity	Location	Type ID	Status
TBL_SCA_001	Info	Collateral.sol:84	CS-10	fixed
TBL_SCA_002	Info	Collateral.sol:62	CS-12	fixed
TBL_SCA_003	Info	Collateral.soll:15	CS-08	fixed
TBL_SCA_004	Info	Stakingl.sol:57	CS-10	fixed
TBL_SCA_005	Info	Stakingl.sol:132	CS-10	fixed
TBL_SCA_006	Info	Staking.sol:126	CS-12	fixed
TBL_SCA_007	Info	Router.sol:70	CS-12	fixed

Details

• ID: TBL_SCA-001

• Severity: Informational

• Type: CS-10 (Gas consumption)

• Description:

The second validation of “amount > 0” is already done at line 81. So this validation can be removed to save gas consumption.

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “2a2ec36ced889e44c11ca25bf2537dc1a6d92632”

• ID: TBL_SCA-002

• Severity: Informational

• Type: CS-12 (Sanity Checks)

• Description:

For key parameters in the system, it is recommended to add some sanity checks on update.

It is recommended to validate the parameter *stakingContract* to be a non-zero value before the assignment.

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “2a2ec36ced889e44c11ca25bf2537dc1a6d92632”

• ID: TBL_SCA-003

• Severity: Informational

• Type: CS-08 (Event Standard)

• Description:

When defining an Event with address parameters, it is recommended to add “indexed” keyword for them for better query operations.

We advise to update these Events as follows:

event Deposit(address indexed sender, address indexed asset, uint amount);
event Withdraw(address indexed sender, address indexed asset, uint amount);
event ReduceUnlockedAmount(address indexed depositor, address indexed asset, uint unlockedAmount);

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “2a2ec36ced889e44c11ca25bf2537dc1a6d92632”

• ID: TBL_SCA-004

• Severity: Informational

• Type: CS-10 (Gas consumption)

• Description:

The storage variable *_userLastClaimTimestamps* can be put into the structure of *UserStakingItem* to save gas consumption. The variables *_userStakingItems* and *_userLastClaimTimestamps* are both used in similar scenarios. Putting it into the *UserStakingItem* structure would save the extra mapping calculation operation.

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “fe6bf7b4b8bb524a587ffc4edeb847375f931b8c”

• ID: TBL_SCA-005

• Severity: Informational

• Type: CS-10 (Gas consumption)

• Description:

The function *setFactory()* is not necessary since the *updateConfig()* includes the functionality to update the *_factory* variable.

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “fe6bf7b4b8bb524a587ffc4edeb847375f931b8c”

• ID: TBL_SCA-006

• Severity: Informational

• Type: CS-12 (Sanity Checks)

• Description:

For key parameters in the system, it is recommended to add some sanity checks on update.

It is recommended to validate the parameters *factory*, *govToken*, or *collateralContract* to be a non-zero value before the assignment.

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “fe6bf7b4b8bb524a587ffc4edeb847375f931b8c”

• ID: TBL_SCA-007

• Severity: Informational

• Type: CS-12 (Sanity Checks)

• Description:

For key parameters in the system, it is recommended to add some sanity checks on update.

It is recommended to validate parameters *uniswapFactory*, *factory*, *busdAddress*, and *kalaAddres* to be a non-zero value before the assignment.

• Remediation:

The dev team has updated the contract in the updated version with SHA1 value “472eb2072caaf431f729ad117d659d8e64a2e720”