



SOLIDProof
Bring trust into your projects

Blockchain Security | Smart Contract Audits | KYC

MADE IN GERMANY

Audit

Security Assessment
31. August, 2021

For



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Disclaimer

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Version	Date	Description
1.0	31. August 2021	<ul style="list-style-type: none">• Layout project• Automated- /Manual-Security Testing• Summary

Network

Binance Smart Chain (BEP20)

Website

<https://www.kawaiiswap.finance/>

Docs

<https://kawaiiswap.gitbook.io/kawaiiswap-finance/>

Twitter

<https://twitter.com/kawaiiswap>

Telegram announcements

<https://t.me/KawaiiSwapAnn>

Telegram chat

<https://t.me/kawaiiswap>

Discord

<https://discord.gg/rhkHuSMzTR>

Description

KawaiiSwap project enriches traditional yield farming experience with gamification features. We prove exciting user interaction with our platform and bringing constant utility to our native token therefore ensuring continuous growth of the project.

KawaiiSwap users are able to win tokens and NFTs in games run on the platform or complete quests to gain APR boosts. NFTs can be traded on the marketplace or used for game activities. KAWAI token holders are able to become shareholders and receive dividends just by holding tokens in the wallet as well as to participate in decision-making process.

KawaiiSwap project is backed by the team of professional developers and belongs to "Brainstorm Digital" Ltd company. Our vision is to extend gamification aspects of the platform way beyond yield farming app by creating fictional world with play to earn model that combines traditional RPG experience with NFT ownership.

Project Engagement

During the 27th of August 2021, **Calcifer & HowlsCastle 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

Calcifer.sol

<https://bscscan.com/address/0x9D13Cc6FABDe882E059413c524a32BA5befebD8b#code>

HowlsCastle

<https://bscscan.com/address/0x0efEc11A28c8cA0Dc05941da21989904181bff59#code>

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)
Critical	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.
High	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.
Medium	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.
Low	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.
Informational	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
 - Address
 - Ownable
 - SafeMath
 - Context
 - BEP20
 - IBEP20
 - SafeBEP20



Tested Contract Files

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

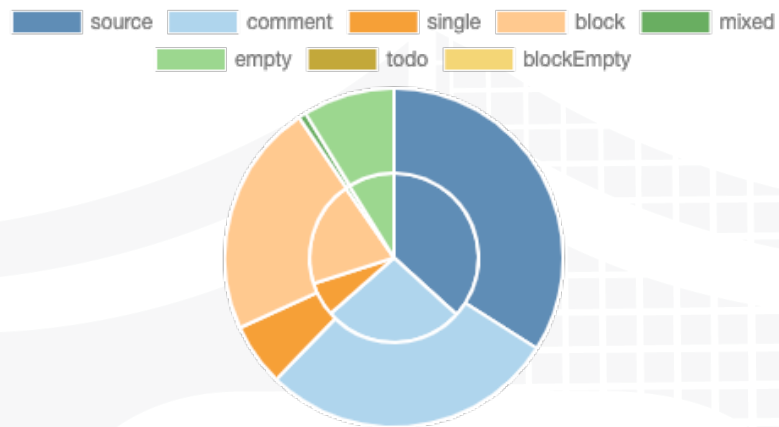
A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

v1.0

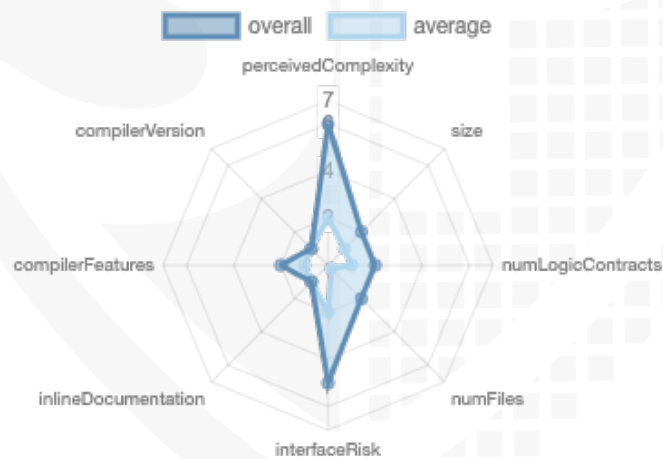
File Name	SHA-1 Hash
contracts/CalciferToken.sol	9d920fe7dbf8c05e9820e4dc3c5230f0766a61a3
contracts/IBEP20.sol	3f32bde238edaa253d2d566c1739127b9b3b8bce
contracts/BEP20.sol	4c9721f43371afe16f85f793c2a09348c5ddfc7f
contracts/HowlsCastle.sol	393868557f57da6b95e3aa055cb39f549a4d74e8
contracts/Context.sol	02ebe0e93c5d1da25b91ba7f4cfb990a949263f8
contracts/SafeBEP20.sol	96bc8a79b9bd44b8d86c0a7dc9d5560929463755
contracts/Address.sol	66db1de364ee244b292cf4cc5e63385e8f6b9420
contracts/SafeMath.sol	3906485abfad296a4f57098778ae0b75fec61892
contracts/Ownable.sol	c57eeae2ac28d0fc290adad8b457bb8db3ef8613
contracts/ICalciferReferral.sol	93df304976aaba250b1ae8ff32a07793bb446378

Metrics

Source Lines v1.0



Risk Level v1.0



Capabilities

Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	3	3	2	2

Exposed Functions

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

Version	Public	Payable
1.0	72	0

Version	External	Internal	Private	Pure	View
1.0	23	116	2	16	34

State Variables

Version	Total	Public
1.0	50	39

Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	0.6.12 >=0.6.4 >=0.4.0 >=0.6.0 <0.8.0 >=0.6.2 <0.8.0			yes (3 asm blocks)	

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



Scope of Work

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. Correct implementation of Token standard
2. Deployer cannot mint any new tokens
3. Deployer cannot burn or lock user funds
4. Deployer cannot pause the contract
5. Overall checkup (Smart Contract Security)

Inheritance Graph v1.0



Verify Claims

Correct implementation of Token standard

Tested	Verified
✓	✓

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	✓	✓	✓

Optional implementations

Function	Description	Exist	Tested	Verified
renounceOwnership	Owner renounce ownership for more trust	✓	✓	✗

Deployer cannot mint any new tokens

Name	Exist	Tested	Verified	File
Deployer cannot mint	✓	✓	✗	CalciferToken
Comment	Line: -			

Max / Total Supply: 800000000000000000000000 (BSCScan: 30. August 2021)

1. approve	→
2. decreaseAllowance	→
3. delegate	→
4. delegateBySig	→
5. increaseAllowance	→
6. mint	→
7. mint	→
8. renounceOwnership	→
9. setExcludedFromAntiWhale	→
10. setExcludedFromTransferTax	→
11. transfer	→
12. transferFrom	→
13. transferOperator	→
14. transferOwnership	→
15. updateBurnRate	→
16. updateMaxTransferAmountRate	→
17. updateTransferTaxRate	→

Deployer cannot burn or lock user funds

Name	Exist	Tested	Verified
Deployer cannot lock	✓	✓	✓
Deployer cannot burn	✓	✓	✓

1. approve	→
2. decreaseAllowance	→
3. delegate	→
4. delegateBySig	→
5. increaseAllowance	→
6. mint	→
7. mint	→
8. renounceOwnership	→
9. setExcludedFromAntiWhale	→
10. setExcludedFromTransferTax	→
11. transfer	→
12. transferFrom	→
13. transferOperator	→
14. transferOwnership	→
15. updateBurnRate	→
16. updateMaxTransferAmountRate	→
17. updateTransferTaxRate	→

Deployer cannot pause the contract

Name	Exist	Tested	Verified
Deployer cannot pause	✓	✓	✓

1. approve	→
2. decreaseAllowance	→
3. delegate	→
4. delegateBySig	→
5. increaseAllowance	→
6. mint	→
7. mint	→
8. renounceOwnership	→
9. setExcludedFromAntiWhale	→
10. setExcludedFromTransferTax	→
11. transfer	→
12. transferFrom	→
13. transferOperator	→
14. transferOwnership	→
15. updateBurnRate	→
16. updateMaxTransferAmountRate	→
17. updateTransferTaxRate	→

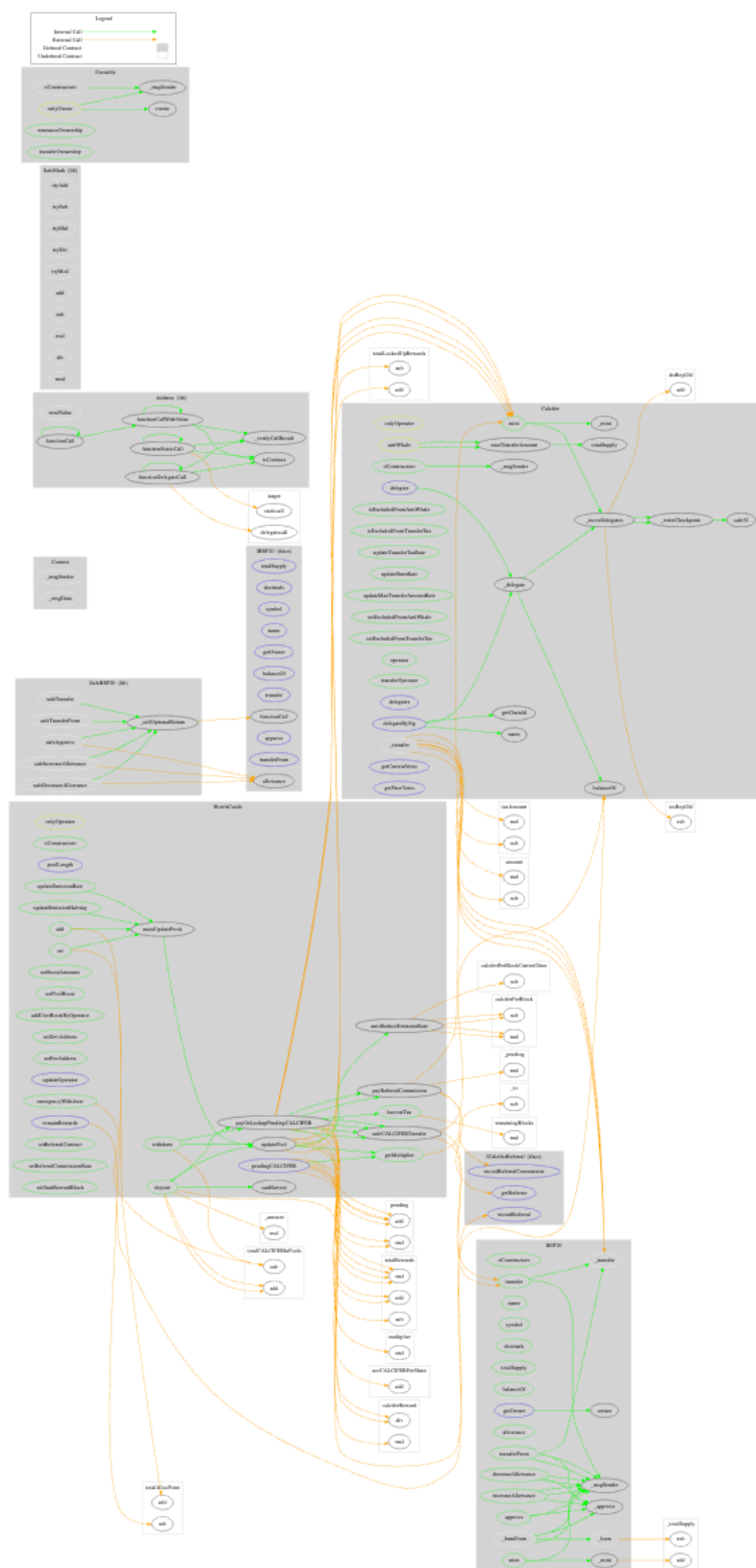
Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓

Legend


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

CallGraph



Source Units in Scope

v1.0

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
	contracts/CalciferToken.sol	1	————	405	375	218	102	155	
	contracts/IBEP20.sol	————	1	93	22	17	66	21	————
	contracts/BEP20.sol	1	————	298	298	98	170	91	————
	contracts/HowIsCastle.sol	1	————	540	540	375	98	298	
	contracts/Context.sol	1	————	24	24	10	12	1	
	contracts/SafeBEP20.sol	1	————	75	74	33	32	25	————
	contracts/Address.sol	1	————	189	169	78	113	47	
	contracts/SafeMath.sol	1	————	214	214	61	139	16	
	contracts/Ownable.sol	1	————	69	69	27	33	24	————
	contracts/CalciferReferral.sol	————	1	20	9	3	10	7	————
	Totals	8	2	1927	1794	920	775	685	

Legend

Attribute	Description
Lines	total lines of the source unit
nLines	normalized lines of the source unit (e.g. normalizes functions spanning multiple lines)
nSLOC	normalized 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

AUDIT PASSED

Critical issues

- no critical issues found -

High issues

- no high issues found -

Medium issues

- no medium issues found -

Low issues

Issue	File	Type	Line	Description
#1	HowlsCastle	Read of persistent state following external call	354, 304, 313, 315, 320, 335, 339, 296, 305, 306, 307, 309, 232, 362, 365, 367, 303,	The contract account state is accessed after an external call. To prevent reentrancy issues, consider accessing the state only before the call, especially if the callee is untrusted.
#2	HowlsCastle	Missing Zero Address Validation (missing-zero-check)	140	Check that the address is not zero

Informational issues

Issue	File	Type	Line	Description
#1	CalciferToken	Functions that are not used (dead-code)	69	Remove unused functions

Audit Comments

30. August 2021:

- There is still an owner (Owner still has not renounced ownership)
- HowlsCastle.sol
 - The constructor can be given addresses, which we cannot check, because they can be set variable



SWC Attacks

ID	Title	Relationships	Status
SW C-13 6	Unencrypted Private Data On-Chain	CWE-767: Access to Critical Private Variable via Public Method	PASSED
SW C-13 5	Code With No Effects	CWE-1164: Irrelevant Code	PASSED
SW C-13 4	Message call with hardcoded gas amount	CWE-655: Improper Initialization	PASSED
SW C-13 3	Hash Collisions With Multiple Variable Length Arguments	CWE-294: Authentication Bypass by Capture-replay	PASSED
SW C-13 2	Unexpected Ether balance	CWE-667: Improper Locking	PASSED
SW C-13 1	Presence of unused variables	CWE-1164: Irrelevant Code	PASSED
SW C-13 0	Right-To-Left-Override control character (U+202E)	CWE-451: User Interface (UI) Misrepresentation of Critical Information	PASSED
SW C-12 9	Typographical Error	CWE-480: Use of Incorrect Operator	PASSED
SW C-12 8	DoS With Block Gas Limit	CWE-400: Uncontrolled Resource Consumption	PASSED

SW C-12 7	Arbitrary Jump with Function Type Variable	CWE-695: Use of Low-Level Functionality	PASSED
SW C-12 5	Incorrect Inheritance Order	CWE-696: Incorrect Behavior Order	PASSED
SW C-12 4	Write to Arbitrary Storage Location	CWE-123: Write-what-where Condition	PASSED
SW C-12 3	Requirement Violation	CWE-573: Improper Following of Specification by Caller	PASSED
SW C-12 2	Lack of Proper Signature Verification	CWE-345: Insufficient Verification of Data Authenticity	PASSED
SW C-12 1	Missing Protection against Signature Replay Attacks	CWE-347: Improper Verification of Cryptographic Signature	PASSED
SW C-12 0	Weak Sources of Randomness from Chain Attributes	CWE-330: Use of Insufficiently Random Values	PASSED
SW C-11 9	Shadowing State Variables	CWE-710: Improper Adherence to Coding Standards	PASSED
SW C-11 8	Incorrect Constructor Name	CWE-665: Improper Initialization	PASSED
SW C-11 7	Signature Malleability	CWE-347: Improper Verification of Cryptographic Signature	PASSED

SW C-11 6	Timestamp Dependence	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SW C-11 5	Authorization through tx.origin	CWE-477: Use of Obsolete Function	PASSED
SW C-11 4	Transaction Order Dependence	CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')	PASSED
SW C-11 3	DoS with Failed Call	CWE-703: Improper Check or Handling of Exceptional Conditions	PASSED
SW C-11 2	Delegatecall to Untrusted Callee	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SW C-111	Use of Deprecated Solidity Functions	CWE-477: Use of Obsolete Function	PASSED
SW C-11 0	Assert Violation	CWE-670: Always-Incorrect Control Flow Implementation	PASSED
SW C-10 9	Uninitialized Storage Pointer	CWE-824: Access of Uninitialized Pointer	PASSED
SW C-10 8	State Variable Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED
SW C-10 7	Reentrancy	CWE-841: Improper Enforcement of Behavioral Workflow	NOT PASSED
SW C-10 6	Unprotected SELFDESTRUCT Instruction	CWE-284: Improper Access Control	PASSED

SW C-10 5	Unprotected Ether Withdrawal	CWE-284: Improper Access Control	PASSED
SW C-10 4	Unchecked Call Return Value	CWE-252: Unchecked Return Value	PASSED
SW C-10 3	Floating Pragma	CWE-664: Improper Control of a Resource Through its Lifetime	NOT PASSED
SW C-10 2	Outdated Compiler Version	CWE-937: Using Components with Known Vulnerabilities	PASSED
SW C-10 1	Integer Overflow and Underflow	CWE-682: Incorrect Calculation	PASSED
SW C-10 0	Function Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED

The logo features the words "Solid Proofed" in a white, elegant script font. The text is superimposed on a dark blue background that contains a faint, stylized shield emblem. The shield has a grid-like pattern and is partially obscured by the text.

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A small horizontal bar representing the German flag, with black, red, and gold stripes.

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