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**Blockchain Security | Smart Contract Audits | KYC  
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MADE IN GERMANY

# Okapi - Staking Audit

**Security Assessment  
04. November, 2022**

**For**



**SolidProof\_io**



**@solidproof\_io**

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Version	Date	Description
1.0	02. November 2022	<ul style="list-style-type: none"><li>• Layout project</li><li>• Automated- /Manual-Security Testing</li><li>• Summary</li></ul>
1.1	04. November 2022	<ul style="list-style-type: none"><li>• Reaudit</li></ul>

## **Network**

Ethereum (ERC20)

## **Website**

<http://okapitoken.com/>

## **Telegram**

<https://t.me/okapiportal>

## **Twitter**

[https://twitter.com/okapi\\_eth](https://twitter.com/okapi_eth)

## **Medium**

<https://medium.com/@okapiETH>



## Description

TBA

## Project Engagement

During the 31st of October 2022, **Okapi 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

- <https://goerli.etherscan.io/address/0x46b0069b97121a0a502e2556c6dba419d95533c2#code>

### v1.0

- <https://goerli.etherscan.io/address/0xf1dd2d8e83592cbddbff08cbac667c467a3e0d14#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)
<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:

IERC20  
Context  
Ownable  
 SafeMath





## 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

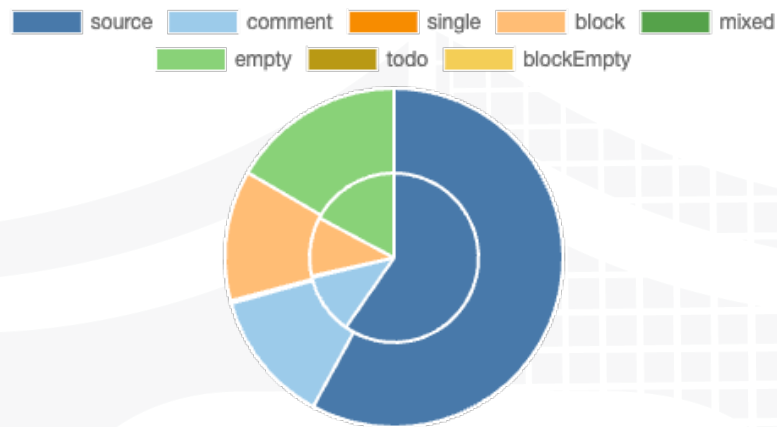
File Name	SHA-1 Hash
contracts/staking.sol	0097dd05c8c2c4bac1c8d85afc92bcc6be57a6d0

### v1.1

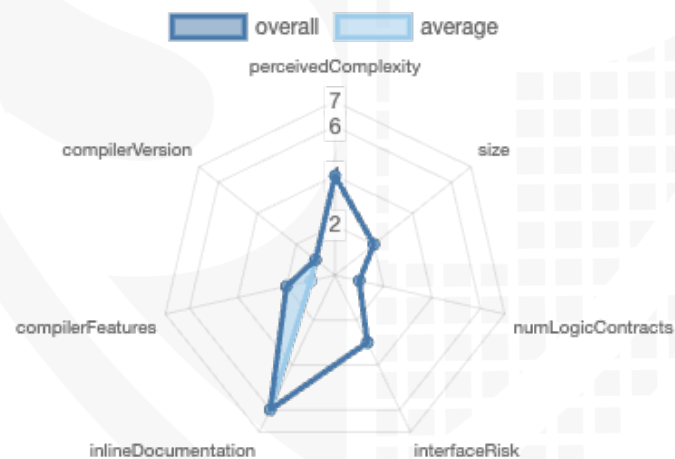
File Name	SHA-1 Hash
contracts/staking.sol	c117bf38c447d3611c7f4afbe98ec91ebda6d6ef

# Metrics

## Source Lines v1.0



## Risk Level v1.0



## Capabilities

### Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	1	1	1	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	26	4

Version	External	Internal	Private	Pure	View
1.0	7	22	0	4	12

### State Variables

Version	Total	Public
1.0	11	9

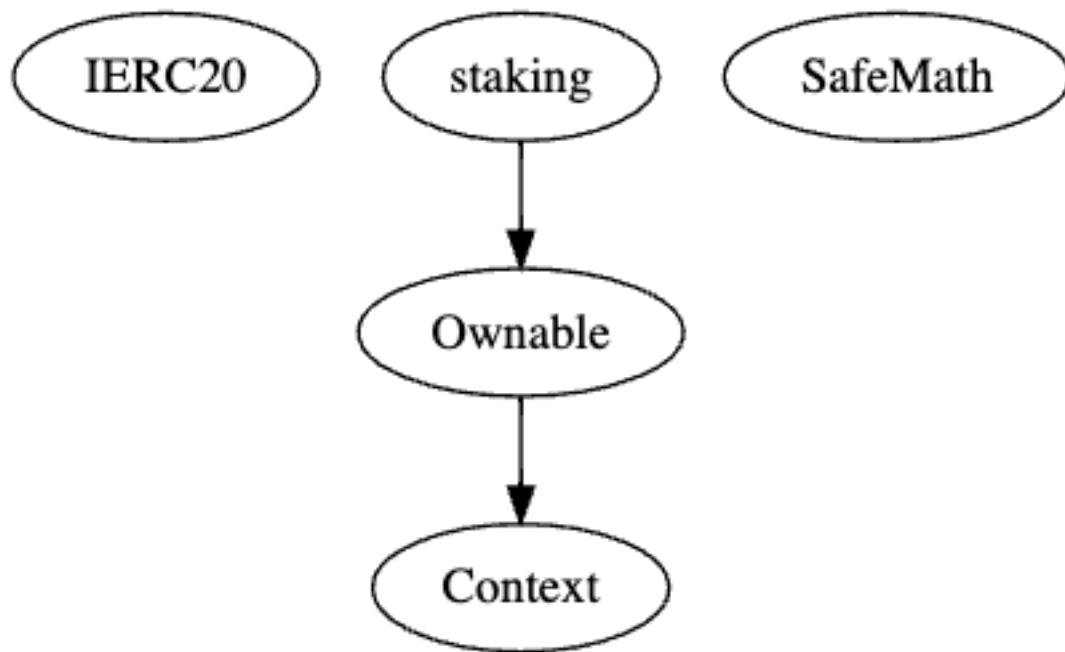
### Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	<code>^0.8.16</code>		yes		

Version	Transfers ETH	Low-Level Calls	DelegateCall	Uses Hash Functions	EC Recover	New/Create/Create2
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1.0	yes					
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## Inheritance Graph v1.0



# CallGraph 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. Deployer cannot mint any new tokens
3. Deployer cannot burn or lock user funds
4. Deployer cannot pause the contract
5. Deployer cannot set fees
6. Deployer cannot blacklist/antisnipe addresses
7. Overall checkup (Smart Contract Security)



## Is contract an upgradeable

Name	
Is contract an upgradeable?	No



## Write functions of contract v1.0

1. `compund` (0x9bf2b4a6)

2. `invest` (0x2afcf480)

3. `renounceOwnership` (0x715018a6)

4. `setRewardPercentage` (0x09653674)

5. `setTax` (0x667f6526)

6. `setWallet` (0xdeaa59df)

7. `toggleSale` (0xaab402e5)

8. `transferOwnership` (0xf2fde38b)

9. `withdrawRewardToken` (0xaa7a07e9)

10. `withdrawTokens` (0x8d8f2adb)

11. `withdrawBNB` (0x8fdb9ce)

12. `withdrawITokens` (0xecb13a49)



## Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	—	—	—



## Deployer cannot burn or lock user funds

Name	Exist	Tested	Status
Deployer cannot lock	✓	✓	✓
Deployer cannot burn	—	—	—

Comments:

### v1.0

- Owner can lock user funds by
  - Setting “depoiteTax” to or above 100%
  - setting “hasStart” to false

### v1.1

- State variable “hasStart” was removed from the deployer in the contract

## Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause	✓	✓	✓

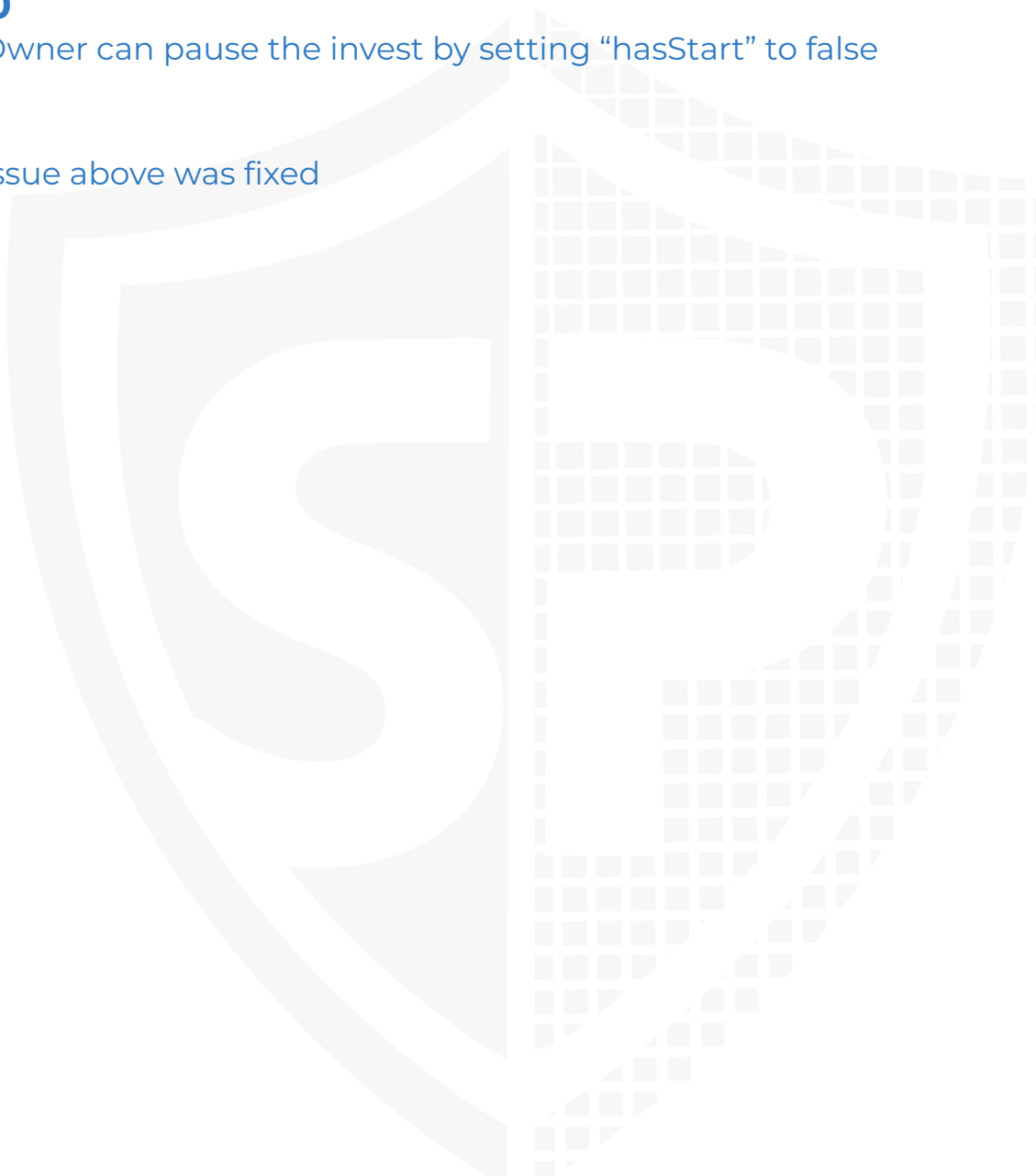
Comments:

### v1.0

- Owner can pause the invest by setting “hasStart” to false

### v1.1

- Issue above was fixed



## Deployer cannot set fees

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

Comments:

### v1.0

- Fees can be set without any limitations. This causes that the whole amount to invest will go to the treasury address. The same for withdrawing funds with the “withdrawTax” variable. Beware of it.

### v1.1

- Fees can be set to max 2%

## Deployer can blacklist/antisnipe addresses

Name	Exist	Tested	Status
Deployer cannot blacklist/antisnipe addresses	—	—	—



## Overall checkup (Smart Contract Security)

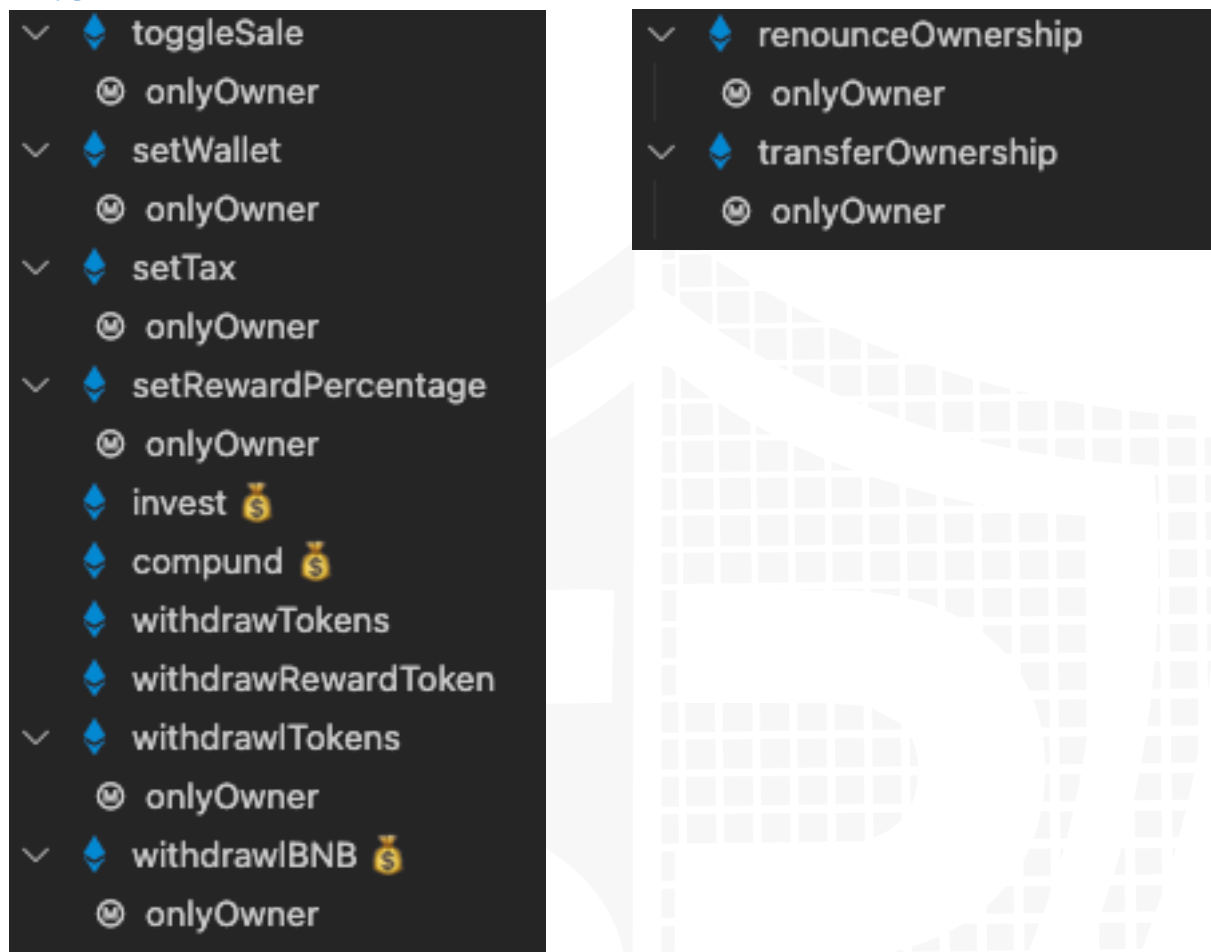
Tested	Verified
✓	✓

### Legend

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

# Modifiers and public functions

v1.0



## Comments

- Deployer can set following state variables without any limitations
  - depoiteTax
  - withdrawTax
  - rewardPercentage
- Deployer can enable/disable following state variables
  - hasStart
- Deployer can set following addresses
  - treasury
- Existing Modifiers
  - onlyOwner
- Owner
  - can take out whole contract balance with the “withdrawIBNB” function and also the tokens with “withdrawToken”

- Can set the reward percentage to 100%. That means that you are not able to withdraw your rewards. Also when the owner took out the tokens from the contract you will not get any rewards either.

## v1.1





- hasStart has been removed from the contract
- Following state variables has a restriction now and cannot become 100% or above
  - depoiteTax
  - withdrawTax

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



# Source Units in Scope

## v1.0

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
	contracts/staking.sol	4	1	336	298	201	49	217	
	Totals	4	1	336	298	201	49	217	

### 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

Issue	File	Type	Line	Description
#1	Main	Owner can lock user funds by setting reward percentage up to 100%	See description	The owner is able to set the the rewardPercentage up to 100% which causes that nobody can withdraw their rewards. You can loose your funds here.

## Low issues

Issue	File	Type	Line	Description
#1	Main	Contract doesn't import npm packages from source (like OpenZeppelin etc.)	-	We recommend to import all packages from npm directly without flatten the contract. Functions could be modified or can be susceptible to vulnerabilities

## Informational issues

Issue	File	Type	Line	Description
#1	Main	Functions that are not used	56	Remove unused functions.  Before removing check the function, it could be possible, that you forget to implement it into the contract

#2	Main	Misspelling	See description	<p>Check the spelling in the contract. There are so many of it.</p> <p>Make sure to change it everywhere else as well.</p>
#3	Main	Unnecessary library	See description	<p>Above pragma 0.8.x you don't need to import SafeMath anymore because it is implemented by default already.</p>

## 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.

### 02. November 2022:

- **Audit not passed because the owner can drain out everything without any limitation**
- Read whole report and modifiers section for more information

### 04. November 2022:

- **Audit not passed because the owner can lock rewards and withdraw it for the investors**
- 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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