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MADE IN GERMANY

# Polkastream Audit

**Security Assessment  
16. February, 2023**

**For**



**\$PSTR**



**SolidProof\_io**



**@solidproof\_io**

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Version	Date	Description
1.0	07. January 2023	<ul style="list-style-type: none"><li>• Layout project</li><li>• Automated- /Manual-Security Testing</li><li>• Summary</li></ul>
	16. January 2023	<ul style="list-style-type: none"><li>• Report adjustments</li></ul>
	02. February 2023	<ul style="list-style-type: none"><li>• Report adjustments</li></ul>
1.1	16. February 2023	<ul style="list-style-type: none"><li>• Reaudit</li></ul>

## **Network**

Binance Smart Chain (BEP20)

## **Website**

<https://polkastream.io>

## **Medium**

[medium.com/polkastream](https://medium.com/polkastream)

## **Telegram**

<https://t.me/polkastream>

## **Discord**

<https://discord.gg/polkastream>

## **Twitter**

<https://twitter.com/polkastream>

## **Reddit**

<https://www.reddit.com/user/polkastream>

## Description

Polkastream is poised to be the next innovative addition to the Polkadot parachain system by building an integrated and intelligently monetized platform for the Web 3.0 streaming and gaming market. On the Polkastream platform, users can listen to music and podcasts, watch movies and TV shows, as well as socialize and play over 40 games in the Polkaverse. In return, streamers and gamers are rewarded with the \$PSTR token, which is uniquely designed with incentivization and token-burning strategies for better rewards, long-term crypto market stability, and data security for all digital media users.

## Project Engagement

On January 7, 2023, the **Polkastream.io Team** contacted Solidproof.io to audit the **\$PSTR** smart contract that they developed. The engagement was technical in nature and focused on identifying security flaws in the design and implementation of the smart contract. On January 12, the **Polkastream.io Team** further requested to audit the **\$PSTR** tokenomics. They provided Solidproof.io with access to the \$PSTR GitHub code repository at <https://github.com/polkastream/pstr> and whitepaper.

## Logo



## Contract Link v1.0

- Github
  - <https://github.com/polkastream/pstr/blob/main/contracts/contract.sol>
  - Commit
    - <https://github.com/polkastream/pstr/commit/f0a5b9a2523bb43da1c026d67804da4b55fcc755>

# 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, the contract was 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 if the code does what it is supposed to according to the specifications, sources, and instructions that were provided to Solidproof.
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  
Ownable





# Tested Contract Files

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

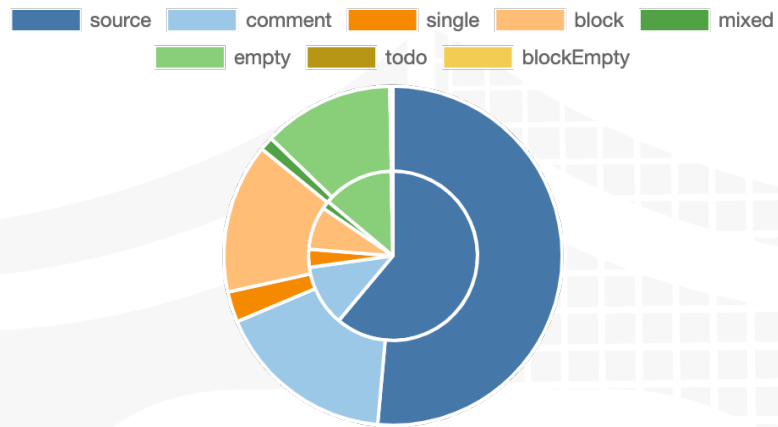
*A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.*

## v1.0

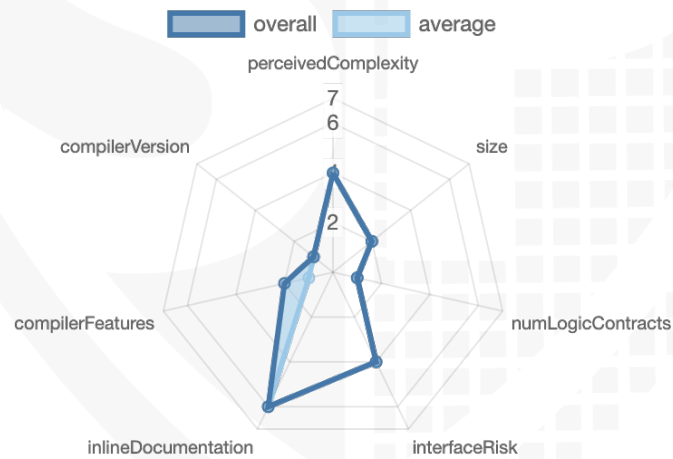
File Name	SHA-1 Hash
contracts/contract.sol	3c03135a94ff9b369c35f36069fe2f3d36b58644

# Metrics

## Source Lines v1.0



## Risk Level v1.0



## Capabilities

### Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	1	0	1	1

### 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	37	0

Version	External	Internal	Private	Pure	View
1.0	10	34	17	5	17

### State Variables

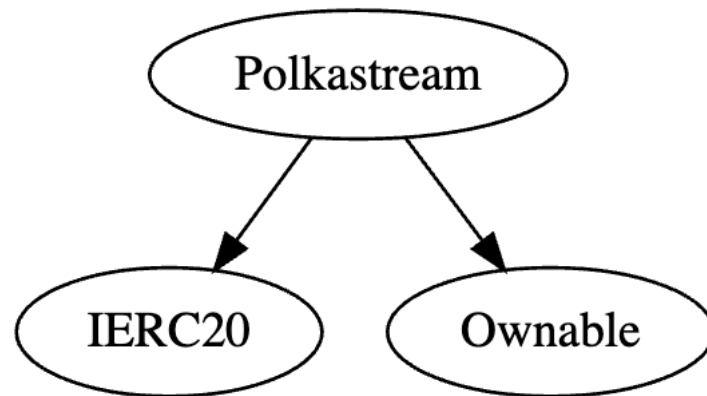
Version	Total	Public
1.0	29	13

### Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	^0.8.17				

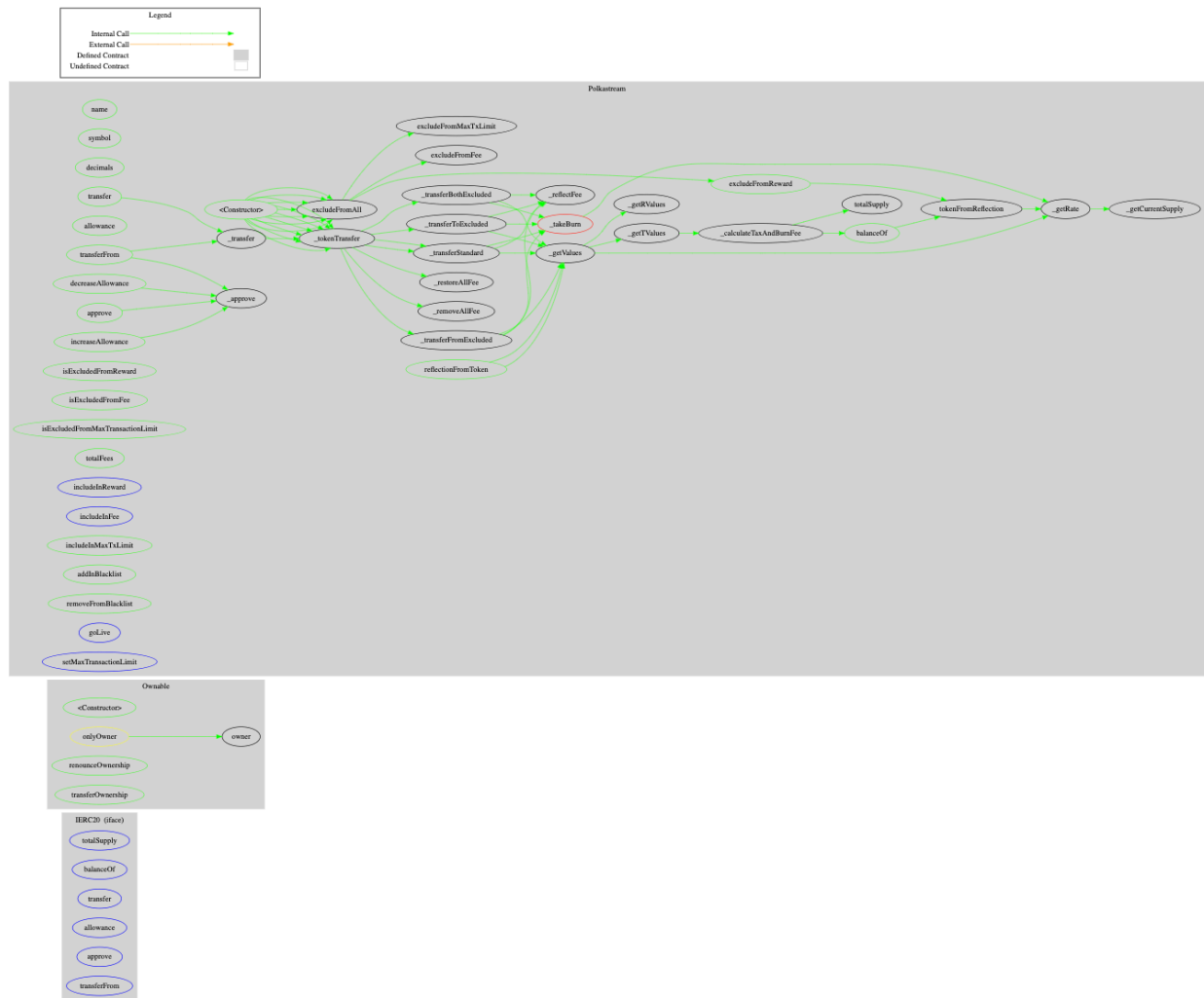
## Inheritance Graph

v1.0



# CallGraph

## v1.0



## Scope of Work/Verify Claims

The Polkastream Team provided us with the \$PSTR smart contract files via its GitHub repository at <https://github.com/polkastream/pstr>. The scope of the audit is the main contract (usually the same name as the team appended with .sol).

We will verify the following claims:

1. Is the contract 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 the contract upgradeable

Name	
Is the contract 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

```
transfer
approve
transferFrom
increaseAllowance
decreaseAllowance
excludeFromReward
includeInReward
excludeFromFee
includeInFee
excludeFromMaxTxLimit
includeInMaxTxLimit
excludeFromAll
addInBlacklist
removeFromBlacklist
goLive
setMaxTransactionLimit
```

## Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	—	—	—
Max / Total Supply	1000000000		



## 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
  - blacklisting addresses
  - Setting max tx amount to 0
- 4% fee is applied per transaction. 3% of that fee is distributed to holders, and 1%, up to 50% of the total supply, is permanently burned.

## Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause the 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 cannot blacklist/antisnipe addresses	✓	✓	✗

Comments:

**v1.0**

- Owner is able to blacklist 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

transfer	renounceOwnership
approve	onlyOwner
transferFrom	transferOwnership
increaseAllowance	onlyOwner
decreaseAllowance	
excludeFromReward	
onlyOwner	
includeInReward	
onlyOwner	
excludeFromFee	
onlyOwner	
includeInFee	
onlyOwner	
excludeFromMaxTxLimit	
onlyOwner	
includeInMaxTxLimit	
onlyOwner	
excludeFromAll	
onlyOwner	
addInBlacklist	
onlyOwner	
removeFromBlacklist	
onlyOwner	
goLive	
onlyOwner	
setMaxTransactionLimit	
onlyOwner	

## Comments

- Deployer can set following state variables without any limitations
  - `_maxTxLimit`
- Deployer can enable/disable following state variables
  - `_isBlacklisted`
  - `_isExcludedFromMaxTxLimit`
  - `_isExcludedFromFee`
  - `_isExcluded`
  - `_excluded`







- Existing Modifiers
  - onlyOwner
- Addresses that are excluded from fee can buy tokens before token goes live
- Sniper duration can be set without any limitation while going live with the token

**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/contract.sol	2	1	546	491	355	118	260	
	<b>Totals</b>	<b>2</b>	<b>1</b>	<b>546</b>	<b>491</b>	<b>355</b>	<b>118</b>	<b>260</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

Issue	File	Type	Line	Description
#1	Main	Missing Zero Address Validation (missing-zero-check)	228	Check that the address is not zero

## Informational issues

**No informational issues**

## 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 those variables, functions etc. do.

### 02. February 2023:

- Read whole report and modifiers section for more information

## Testing Results

### Polkastream contract

#### Deployment

- ✓ Should set the right owner
- ✓ Should set the right name
- ✓ Should set the right symbol
- ✓ Should mint the total supply
- ✓ Should assign 0 tokens to the owner
- ✓ Should correctly distribute the total supply among wallets
- ✓ Should exclude reserved wallets from rewards
- ✓ Should exclude reserved wallets from fees

#### Transactions

- ✓ Should prevent spend before going live
- ✓ Should prevent spend greater than max tx limit

#### Blacklist

- ✓ Should prevent spends from Blacklisted wallets
- ✓ Should allow spends from Non-Blacklisted wallets
- ✓ Should blacklist buys close to going live
- ✓ Should NOT blacklist buys NOT close to going live

#### Claims

- ✓ Is the 4% per \$PSTR transaction fee calculated correctly?
  - Yes
- ✓ Is 75% of the per transaction fee distributed to all holders?
  - Yes
- ✓ Is 25% of the per transaction fee, up to 50% of the max \$PSTR supply, permanently burned?
  - Yes
- ✓ After 50% of the max supply is burned, will the per transaction fee revert to 4% with 100% of it distributed to all holders?
  - Yes
- ✓ Are all company wallets excluded from receiving or paying the per transaction fee before/after the 50% supply burn?
  - Yes
- ✓ Can owner modify the excluded wallets from the per transaction fee?
  - Yes
- ✓ Does \$PSTR have a per transaction limit and if so, how many \$PSTR is the limit?
  - Yes, the initial limit is one million \$PSTR
- ✓ Can the per transaction limit be changed by owner?
  - Yes, to the full amount of smart contract
- ✓ Who can change the \$PSTR smart contract owner?
  - The owner itself.

## 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>NOT 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>NOT 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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