



# SOLIDProof

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

## R3T

-  
Token

# Audit

**Security Assessment  
25. November, 2022**

**For**



**REAL ESTATE<sup>TM</sup>**  
— TOKEN —



**SolidProof\_io**



**@solidproof\_io**

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

## **Network**

Binance Smart Chain (BEP20)

## **Website**

<https://r3-token.io/>

## **Telegram**

<https://t.me/R3TokenPortal>

<https://t.me/R3Token>

## **Twitter**

<https://twitter.com/R3Token?t=tsGtzYFW4QiRW-7NzJbyzg&s=09>

## **Instagram**

[https://instagram.com/r3\\_token?utm\\_medium=copy\\_link](https://instagram.com/r3_token?utm_medium=copy_link)

## **Youtube**

[https://youtube.com/channel/UC\\_JAoBN0\\_L7labS-NbafHGg](https://youtube.com/channel/UC_JAoBN0_L7labS-NbafHGg)

## Description

Real Estate Token is a company that has recognised the opportunities of economic growth and the booming real estate market in South-Eastern Europe and wants to make them accessible to its investors. With its own utility token, the R3T, and an ever-evolving crypto concept, Real Estate Token gives its community the opportunity to participate in the company's vision, achievements and profitable real estate market in South-East Europe.

By specifically merging stably growing real estate assets with a self-developed crypto token, Real Estate Token creates the opportunity to create real estate value with its own crypto concept. The crypto token R3T stands for sociality, digitality and values. As a utility token, it reflects both the success and the awareness of the company and has the purpose of supporting the implementation of the real estate projects. Through this, the token can promote the economic and social development of the respective emerging markets in Europe.

## Project Engagement

During the 23rd of November 2022, **R3T 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



**REAL ESTATE**<sup>TM</sup>  
— TOKEN —

## Contract Link

### v1.0

- <https://bscscan.com/address/0x9e473e54d380f874ad3c3f0cdc9e4f8bc84a728e#code>
- <https://bscscan.com/address/0x0aa95560807b70360c03a2c76e7ac76d1e125f13#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:

```
Context.sol  
IERC20.sol  
ITokenStake.sol  
Ownable.sol  
Pausable.sol  
ReentrancyGuard.sol
```



## Tested Contract Files

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

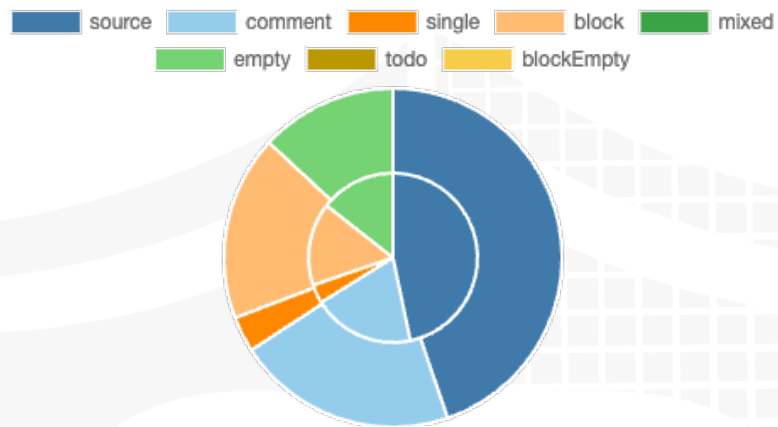
*A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.*

### v1.0

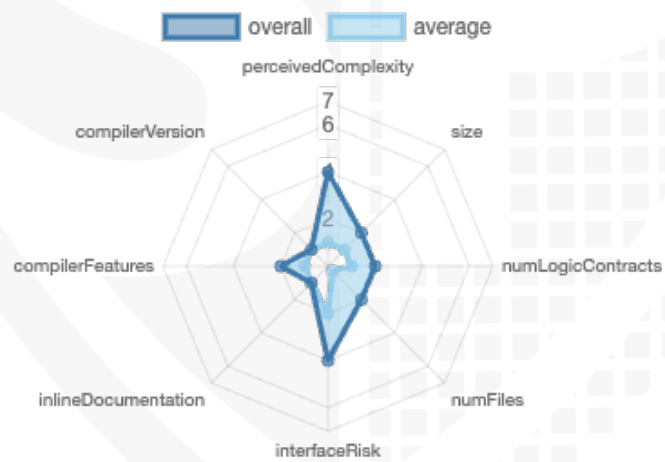
File Name	SHA-1 Hash
contracts/TokenStake.sol	6fc7f049fb92e4ed48e280f57af54d094ae21e26
contracts/Context.sol	6a0b5b8e1b849d1ea73eabcfb1c9cd7e0cdabc91b
contracts/Ownable.sol	b59291b525f7944c65737607e79ed049187e02fd
contracts/Pausable.sol	90d8aec1d6a76420c022382d80bca2dbca8e1e86
contracts/ReentrancyGuard.sol	485093e678649505d929487a0573219be19ba856
contracts/ITokenStake.sol	0dcd6e9187aa7ab6e8b9af2a5e1173554ca383fd
contracts/IERC20.sol	eaafa3412b1ed501679ef641adde5351d6b71566f

# Metrics

## Source Lines v1.0



## Risk Level v1.0



## Capabilities

### Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	1	0	2	4

### 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	39	0

Version	External	Internal	Private	Pure	View
1.0	25	33	0	0	28

### State Variables

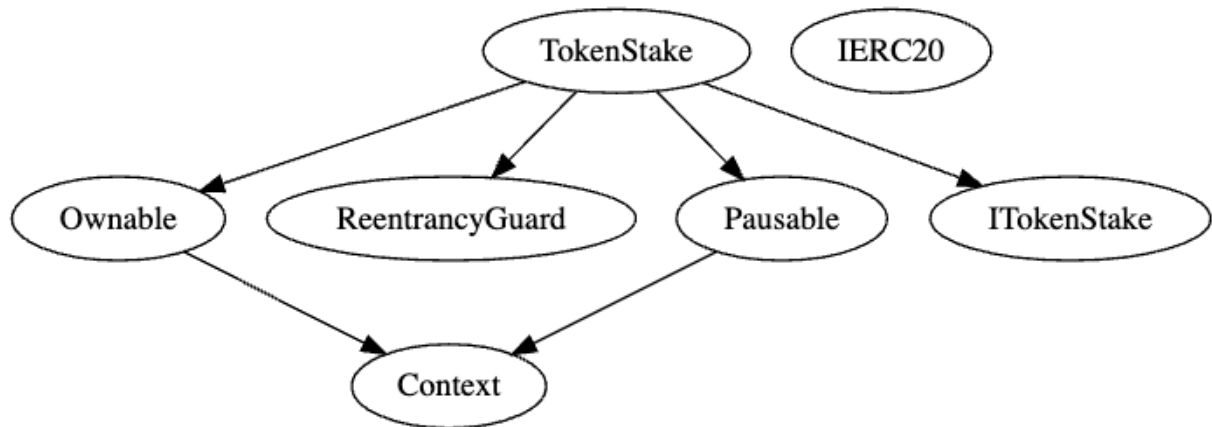
Version	Total	Public
1.0	20	0

### Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	^0.8.0				

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

## 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. 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

1. exit

2. fundContractBalance

3. getReward

4. pause

5. renounceOwnership

6. stake

7. transferOwnership

8. unpause

## 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
  - Pausing the contract

## Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause	✓	✓	✗

Comments:

**v1.0**

- Owner can pause 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	—	—	—



## Overall checkup (Smart Contract Security)

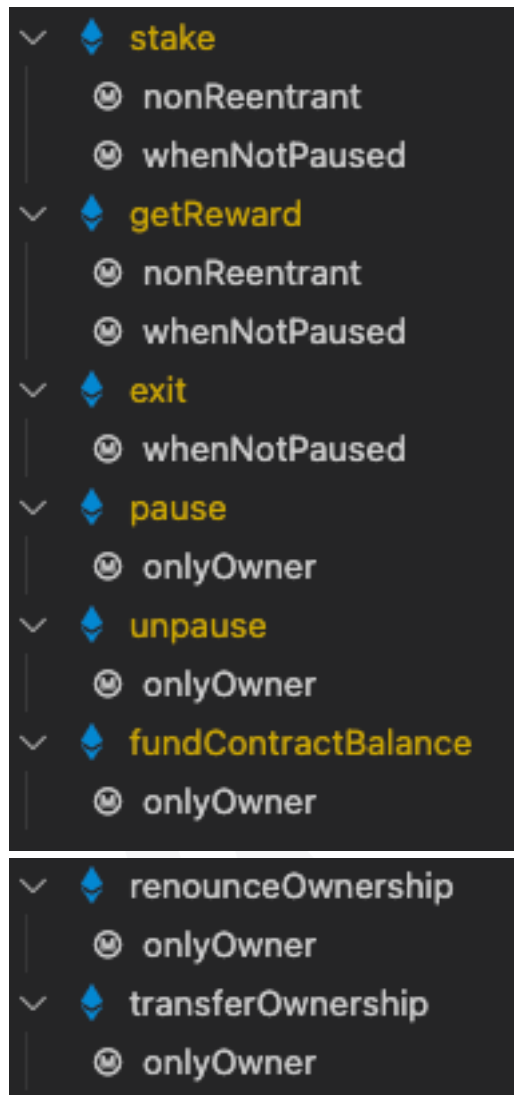
Tested	Verified
✓	✓

### Legend

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

# Modifiers and public functions

v1.0



## Comments













- [Deployer can enable/disable following state variables](#)
  - `_paused`
- [Existing Modifiers](#)
  - `onlyOwner`
  - `whenNotPaused`
  - `whenPaused`
- The owner is able to fund the staking contract with rewardTokens
- Nobody is able to stake, exit or getting rewards when the contract is paused.

**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/TokenStake.sol	1	————	439	382	288	11	210	
	contracts/Context.sol	1	————	24	24	9	12	1	————
	contracts/Ownable.sol	1	————	76	76	28	38	23	————
	contracts/Pausable.sol	1	————	91	91	29	51	16	————
	contracts/ReentrancyGuard.sol	1	————	63	63	15	39	5	
	contracts/ITokenStake.sol	————	1	38	8	3	8	17	————
	contracts/IERC20.sol	————	1	82	27	17	58	13	
	<b>Totals</b>	<b>5</b>	<b>2</b>	<b>813</b>	<b>671</b>	<b>389</b>	<b>217</b>	<b>285</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	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
#2	All	A floating pragma is set	At the top of source code	The current pragma Solidity directive is „^0.8.0“.
#3	Main	Missing Events Arithmetic	334	Emit an event for critical parameter changes

## Informational issues

Issue	File	Type	Line	Description
#1	Context	Functions that are not used	22	<p>Remove unused functions.</p> <p>Before removing check the function, it could be possible, that you forget to implement it into the contract</p>

#2	Main	Misspelling	See description	<p>Change following words:</p> <ul style="list-style-type: none"> <li>- getAllStakesrWithStakingBalance L74</li> </ul> <p>Make sure to change it everywhere else as well.</p>
#3	Main	NatSpec documentation missing	-	If you started to comment your code, also comment all other functions, variables etc.
#4	Main	Start private/internal variables/functions with an underscore	354, 399, 378, 366, 14-32	We recommend you to start internal/private variables/functions with an underscore
#5	Main	Getter	14-32	We recommend you to implement some public getter functions that even investors can read it from blockchain explorers.
#6	Main	Unnecessary address zero check	404	<p>The “updateReward” function is only called in the “createNewStakingSession” function in L354. If you look at the L364 with the following code</p> <pre>updateReward(msg.sender, stakingBalances[msg.sender].length - 1, true);</pre> <p>you can see that the msg.sender will be passed to the “updateReward” function in L399. The zero address cannot call the stake function because nobody owns this address. This causes that the zero address will never call the functions above.</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.

## 25. November 2022:

- The team of R3T tested the tokenStake contract in the testnet
- The owner shared the private key of his wallet to the external dev team that they are able to deploy the contracts with his private key.
- 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>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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