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MADE IN GERMANY

# Neutra Finance

# Audit

**Security Assessment**  
**12. January, 2023**

**For**



**SolidProof\_io**



**@solidproof\_io**

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Version	Date	Description
1.0	09. January 2023	<ul style="list-style-type: none"><li>• Layout project</li><li>• Automated- /Manual-Security Testing</li><li>• Summary</li></ul>

## **Network**

TBA

## **Website**

<https://neutra.finance/>

## **Discord**

<https://discord.com/invite/h5GxDEAxyY>

## **Twitter**

<https://twitter.com/Neutrafinance>

## **Medium**

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



## Description

Neutra Finance aims to make risk-hedged, sustainable investment strategies easily accessible for anyone, anywhere through automated strategy vaults. We strive to make this process simple and easy so that anyone who wants to protect their funds and earn stable returns in any market condition can do so. Upon depositing their capital into our vaults, users can sit back and earn APY above market standards on high-performing DeFi products while the strategy will do the rest, such as optimising returns, rebalancing, and managing liquidation risk.

## Project Engagement

During the Date of 09 January 2023, **Neutra Finance 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://github.com/NeutraFinance/neutra-gmx-contracts>

Commit: 04d177a672ab3db4e91c4c5bd6b39799df3aacd4

# 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:

Dependency / Import Path	Count
@openzeppelin/contracts-upgradeable/proxy/utils/Initializable.sol	1
@openzeppelin/contracts-upgradeable/proxy/utils/UUPSUpgradeable.sol	1
@openzeppelin/contracts/security/ReentrancyGuard.sol	8
@openzeppelin/contracts/token/ERC20/ERC20.sol	1
@openzeppelin/contracts/utils/Address.sol	1



## Tested Contract Files

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

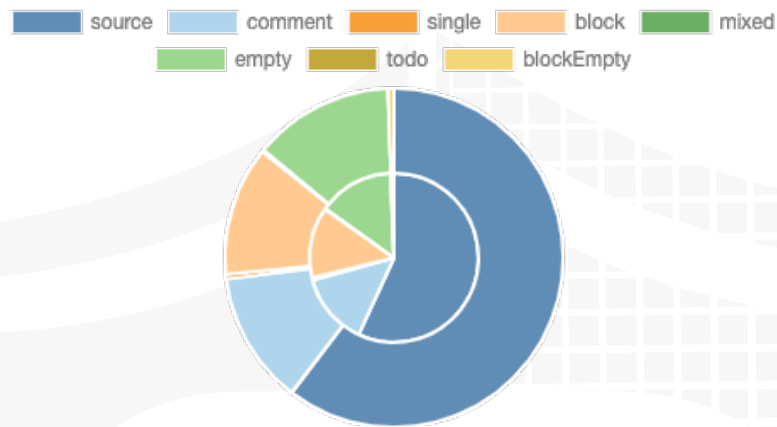
*A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.*

### v1.0

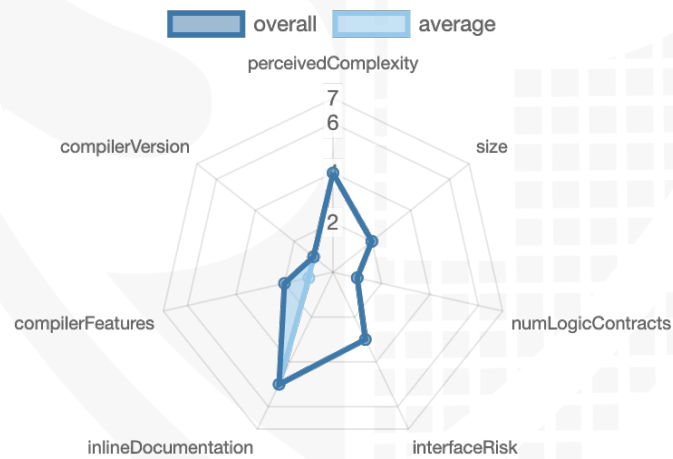
File Name	SHA-1 Hash
contracts/GmxHelper.sol	a54a769134e91c50e37105d098fb73015f8ee832
contracts/Router.sol	75898e31cdebec1ab41742aa894c7982a9b35422
contracts/BatchRouter.sol	ab26f79dcfecc119b0bf4b3b53e2ba4337dca46c
contracts/StrategyVault.sol	1c59c6f2d3cc306fe2e45f2d369dfe68b950c17f

# Metrics

## Source Lines v1.0



## Risk Level v1.0



# Capabilities

## Components

 Contracts	 Libraries	 Interfaces	 Abstract
19	0	17	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.












 Public	 Payable
390	23

External	Internal	Private	Pure	View
322	326	50	0	162

### StateVariables

Total	 Public
252	247

### Capabilities

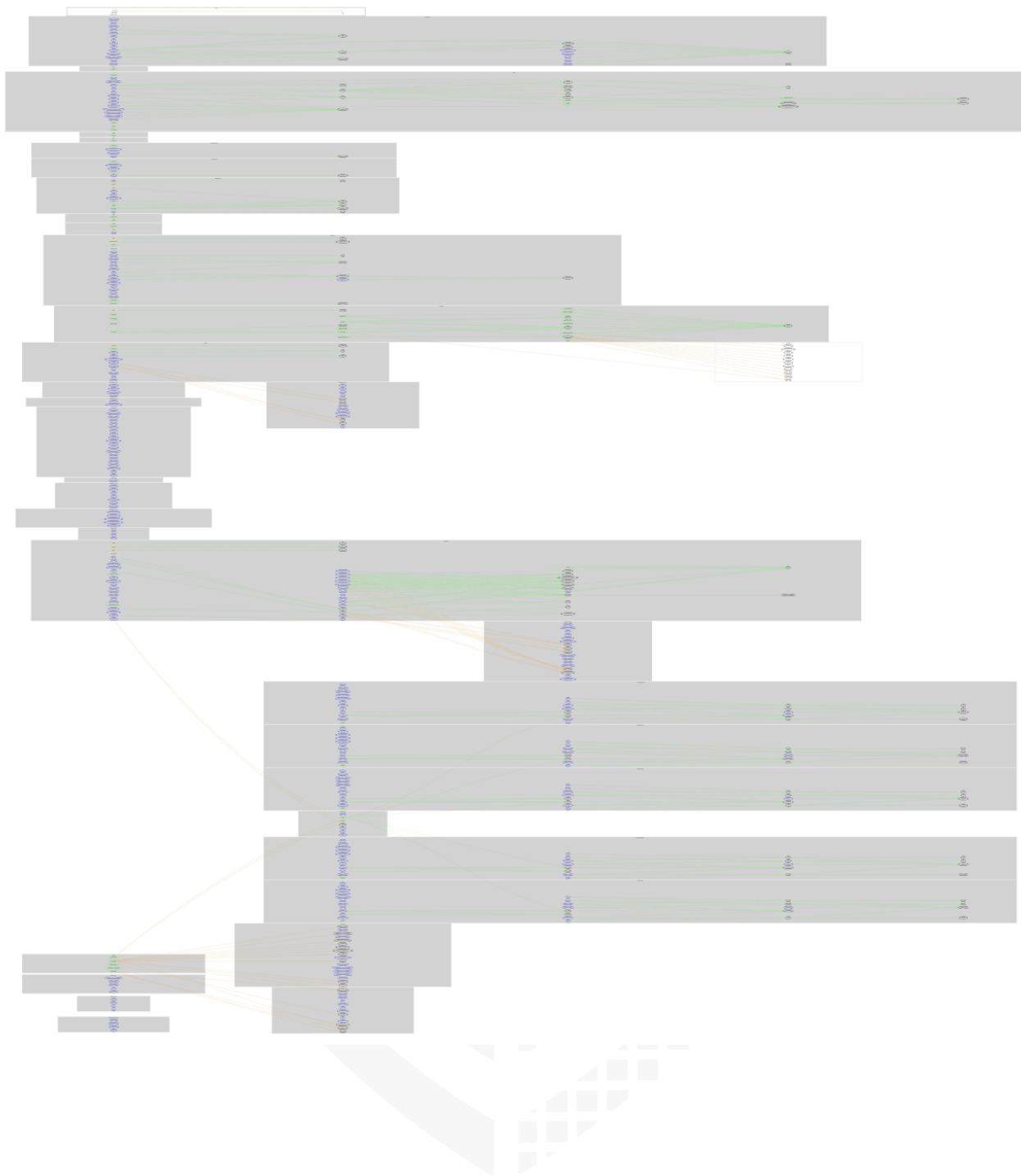
Solidity Versions observed	 Experimental Features	 Can Receive Funds	 Uses Assembly	 Has Destroyable Contracts	
<div>0.8.11</div> <div>^0.8.0</div>		<div>yes</div>	<div></div>	<div></div>	
 Transfers ETH	 Low-Level Calls	 DelegateCall	 Uses Hash Functions	 ECRecover	 New/Create/Create2
<div>yes</div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
 TryCatch	Σ Unchecked				
<div></div>	<div></div>				

# Inheritance Graph



# 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?	Yes

Comments:

### v1.0

- Owner can deploy a new version of the strategy vault contract which can change any limit and give owner new privileges
  - Be aware of this and do your own research for the contract which is the contract pointing to

## 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	✓	✓	✓



## Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	✓	✓	✓
Max / Total Supply	N/A		

Comments:

### v1.0

- Indirect minting is possible by the handler and the gov addresses because in the “Router.sol” contract, the mint function is called 2 times. Once on L102, in the “confirmAndBuy” function and then in the “settle” function. But this is being done in order to collect fees.

## Deployer cannot burn or lock user funds

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



## Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause	—	—	—



## 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 cannot be set without any limitations

## 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

- approveToken
- onlyGov
- reserveDeposit
- reserveWithdraw
- cancelDeposit
- cancelWithdraw
- claimWant
- claimStakedNeuGlp
- claim
- executeBatchPositions
- onlyGov
- confirmAndDealGlp
- onlyGov
- setRouter
- onlyGov
- setDepositLimit
- onlyGov
- setTrackers
- onlyGov
- setExecutionFee
- onlyGov

- approveToken
- onlyGov
- setHandler
- onlyGov
- executePositionsBeforeDealGlp
- onlyHandler
- confirmAndBuy
- onlyHandler
- confirmAndSell
- onlyHandler
- settle
- onlyGov
- setExecutionFee
- onlyGov
- setIsSale
- onlyGov
- setTrackers
- onlyGov

## StrategyVault.sol

- initialize
  - Ⓜ initializer
- minimiseDeltaWithBuyGlp 💰
  - Ⓜ onlyKeepers
- minimiseDeltaWithSellGlp 💰
  - Ⓜ onlyKeepers
- executeIncreasePositions 💰
  - Ⓜ onlyRouter
- executeDecreasePositions 💰
  - Ⓜ onlyRouter
- retryPositions 💰
  - Ⓜ onlyKeepers
- buyNeuGlp
  - Ⓜ onlyRouter
- sellNeuGlp
  - Ⓜ onlyRouter
- confirm
  - Ⓜ onlyRouter
- confirmRebalance
  - Ⓜ onlyKeepers
- harvest
- activateManagementFee
  - Ⓜ onlyGov
- deactivateManagementFee
  - Ⓜ onlyGov
- repayFundingFee 💰
  - Ⓜ onlyKeepers
- exitStrategy 💰
  - Ⓜ onlyGov
- settle

- depositInsuranceFund
  - Ⓜ onlyGov
- buyGlp
  - Ⓜ onlyKeepers
- sellGlp
  - Ⓜ onlyKeepers
- increaseShortPosition 💰
  - Ⓜ onlyKeepers
- decreaseShortPosition 💰
  - Ⓜ onlyKeepers
- setGmxHelper
  - Ⓜ onlyGov
- setMarginFeeBasisPoints
  - Ⓜ onlyGov
- setKeeper
  - Ⓜ onlyGov
- setWant
  - Ⓜ onlyGov
- setExecutionFee
  - Ⓜ onlyGov
- setCallbackTarget
  - Ⓜ onlyGov

- setDepositLimit
  - Ⓜ onlyGov
- setRouter
  - Ⓜ onlyGov
- setManagement
  - Ⓜ onlyGov
- registerAndSetReferralCode
  - Ⓜ onlyGov
- repayUnpaidFundingFee 💰
  - Ⓜ onlyKeepers
- withdrawFees
  - Ⓜ onlyGov
- withdrawInsuranceFund
  - Ⓜ onlyGov
- rescueFunds
  - Ⓜ onlyGov
- withdrawEth 💰
  - Ⓜ onlyGov



## Comments

- Deployer can set following state variables without any limitations
  - Deposit Limit
  - Execution Fee
  - Margin Fees Basis Point
  - Execute Positions
  - Set Sales
  -
- Deployer can set following addresses
  - Router
  - Tracker
  - Handler
- Existing Modifiers
- Gov address can do the following in the strategy vault:
  - can withdraw contract balance
  - can transfer any type of tokens from the contract to itself
  - can transfer any type of tokens to an arbitrary address
  - can set management address to zero address. Recommendation: Zero address check, otherwise the logic of the contract will not work as supposed to be
  - Can set deposit limit to any arbitrary value
- There are several authorities which are authorized to call some functions, that means, if the owner is renounced, another address is still authorized to call functions
  - Be aware of this

## Source Units in Scope v1.0

File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score
contracts/interfaces/IRewardDistributor.sol	—————	1	13	6	3	1	9
contracts/interfaces/IRouter.sol	—————	1	15	6	3	1	10
contracts/interfaces/IStrategyVault.sol	—————	1	31	6	3	1	42
contracts/GmxHelper.sol	1	—————	217	214	169	5	177
contracts/Router.sol	1	—————	175	175	115	18	123

### 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

**No low issues**

## Informational issues

Issue	File	Type	Line	Description
#1	All	NatSpec documentation missing	-	If you started to comment your code, also comment all other functions, variables etc.

## 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.

### 12. December 2023:

- There is still an owner (Owner still has not renounced ownership)
- Owner can deploy a new version of the contract which can change any limit and give owner new privileges
- 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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