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Vitreus Audit

**Security Assessment
20. June, 2023**

For



VITREUS



SolidProof_io



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Version	Date	Description
1.0	14. January 2023	<ul style="list-style-type: none">• Layout project• Automated- /Manual-Security Testing• Summary
	17. June 2023	<ul style="list-style-type: none">• Reaudit
	20. June 2023	<ul style="list-style-type: none">• Reaudit

Network

Ethereum (ERC20)

Binance Smart Chain (BEP20)

Website

<http://vitreus.io>

Telegram

<https://t.me/VitreusChain>

Twitter

Vitreus: <https://twitter.com/VitreusChain>

Chad, Founder: <https://twitter.com/CollabChad>

Brent, Co-Founder: <https://twitter.com/crypfoo12>

Baran: https://twitter.com/Wayne_Lambeau

Jaren: <https://twitter.com/mrscryptorabbit>

Taylor: <https://twitter.com/tcrypto1199>

Facebook

<https://www.facebook.com/VitreusChain>

Instagram

<https://instagram.com/vitreuschain>

Discord

<https://discord.gg/vitreus>

Youtube

<https://www.youtube.com/@VitreusChain>

LinkedIn

<https://www.linkedin.com/company/vitreus-chain>

Description

A permissioned financial services distributed ledger from the infrastructure and software solutions company, Collaborative Digital.

Project Engagement

During the 12th of January 2023, **Vitreus 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



VITREUS

Contract Link v1.0

- Provided as files

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:

Dependency / Import Path	Count
@openzeppelin/contracts-upgradeable/access/OwnableUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/proxy/utils/Initializable.sol	1
@openzeppelin/contracts-upgradeable/proxy/utils/UUPSUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/security/PausableUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/security/ReentrancyGuardUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/token/ERC721/IERC721Upgradeable.sol	1
@openzeppelin/contracts-upgradeable/token/ERC721/extensions/IERC721EnumerableUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/token/ERC721/extensions/IERC721MetadataUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/utils/AddressUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/utils/StringsUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/utils/introspection/ERC165Upgradeable.sol	1
@openzeppelin/contracts/token/ERC721/IERC721Receiver.sol	1
@uniswap/v2-core/contracts/interfaces/IERC20.sol	1
@uniswap/v2-periphery/contracts/interfaces/IUniswapV2Router02.sol	1
operator-filter-registry/src/upgradeable/DefaultOperatorFiltererUpgradeable.sol	1

Tested Contract Files

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

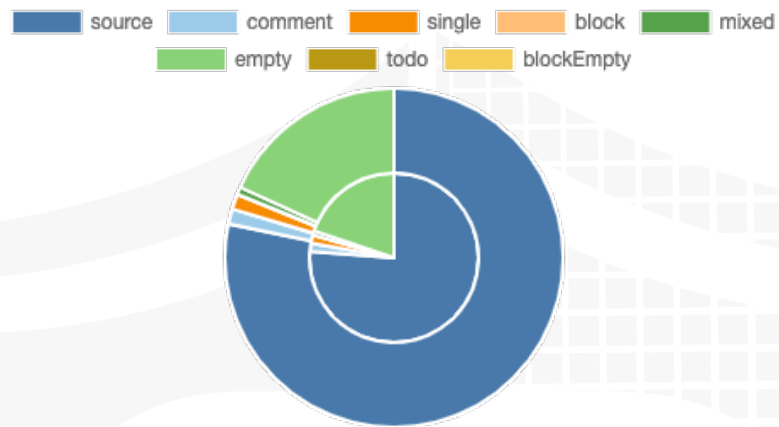
A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

v1.0

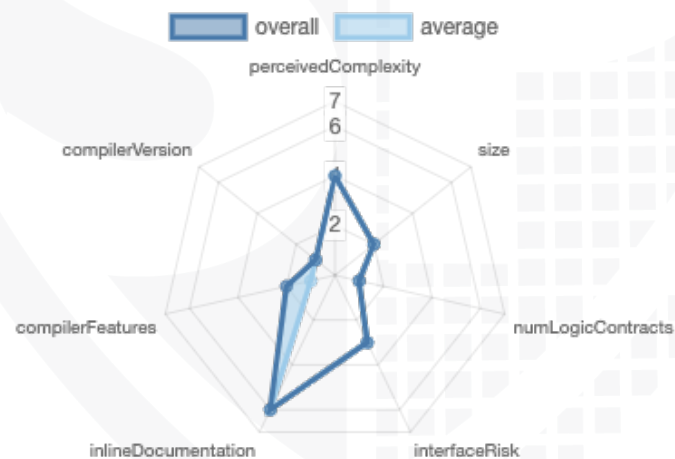
File Name	SHA-1 Hash
contracts/Vitreus.sol	6dc5caa1fb0487a80a4cff80a4cc8f24af448e4b

Metrics

Source Lines v1.0



Risk Level v1.0



Capabilities

Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	1	0	0	0

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	25	3

Version	External	Internal	Private	Pure	View
1.0	12	49	1	0	26

State Variables

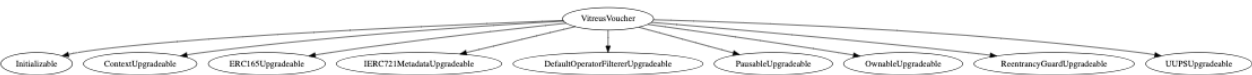
Version	Total	Public
1.0	13	0

Capabilities

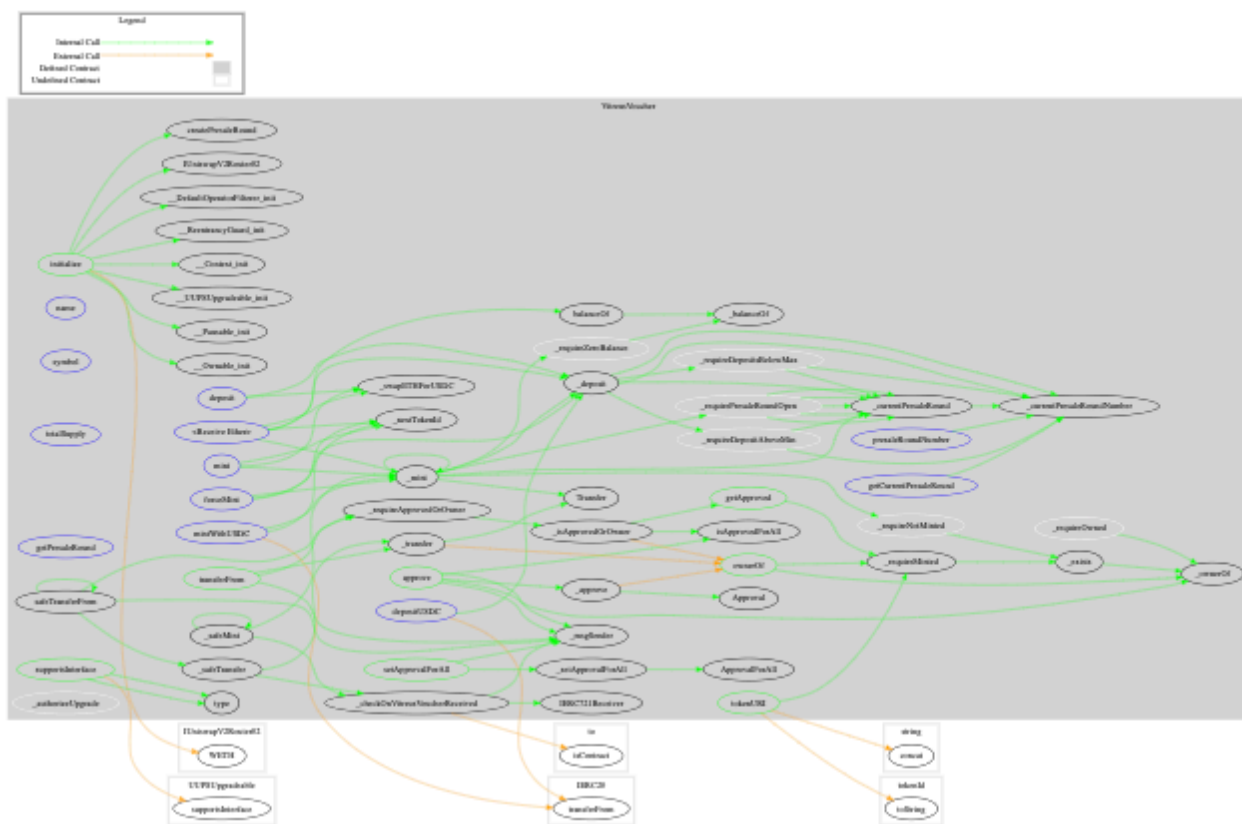
Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	<code>>0.8.9</code>		yes	yes (1 asm blocks)	

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?	Yes

Comments:


v1.0

- Owner can deploy a new version of the 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

ERC721				
Function	Description	Exist	Tested	Verified
BalanceOf	Count all NFTs assigned to an owner	✓	✓	✓
OwnerOf	Find the owner of an NFT	✓	✓	✓
SafeTransferFrom	Transfers the ownership of an NFT from one address to another address	✓	✓	✓
SafeTransferFrom	See above - Difference is that this function has an extra data parameter	✓	✓	✓
TransferFrom	Transfer ownership of an NFT	✓	✓	✓
Approve	Change or reaffirm the approved address for an NFT	✓	✓	✓
SetApprovalForAll	Enable or disable approval for a third party ("operator") to manage all of `msg.sender`'s assets	✓	✓	✓
GetApproved	Get the approved address for a single NFT	✓	✓	✓
IsApprovedForAll	Query if an address is an authorized operator for another address	✓	✓	✓
SupportsInterface	Query if a contract implements an interface	✓	✓	✓
Name	Provides information about the name	✓	✓	✓
Symbol	Provides information about the symbol	✓	✓	✓
TokenURI	Provides information about the TokenUri	✓	✓	✓

Write functions of contract v1.0



approve
createPresaleRound
deposit
depositUSDC
forceMint
initialize
mint
mintWithUSDC
renounceOwnership
safeTransferFrom
safeTransferFrom
setApprovalForAll
transferFrom
transferOwnership
upgradeTo
upgradeToAndCall

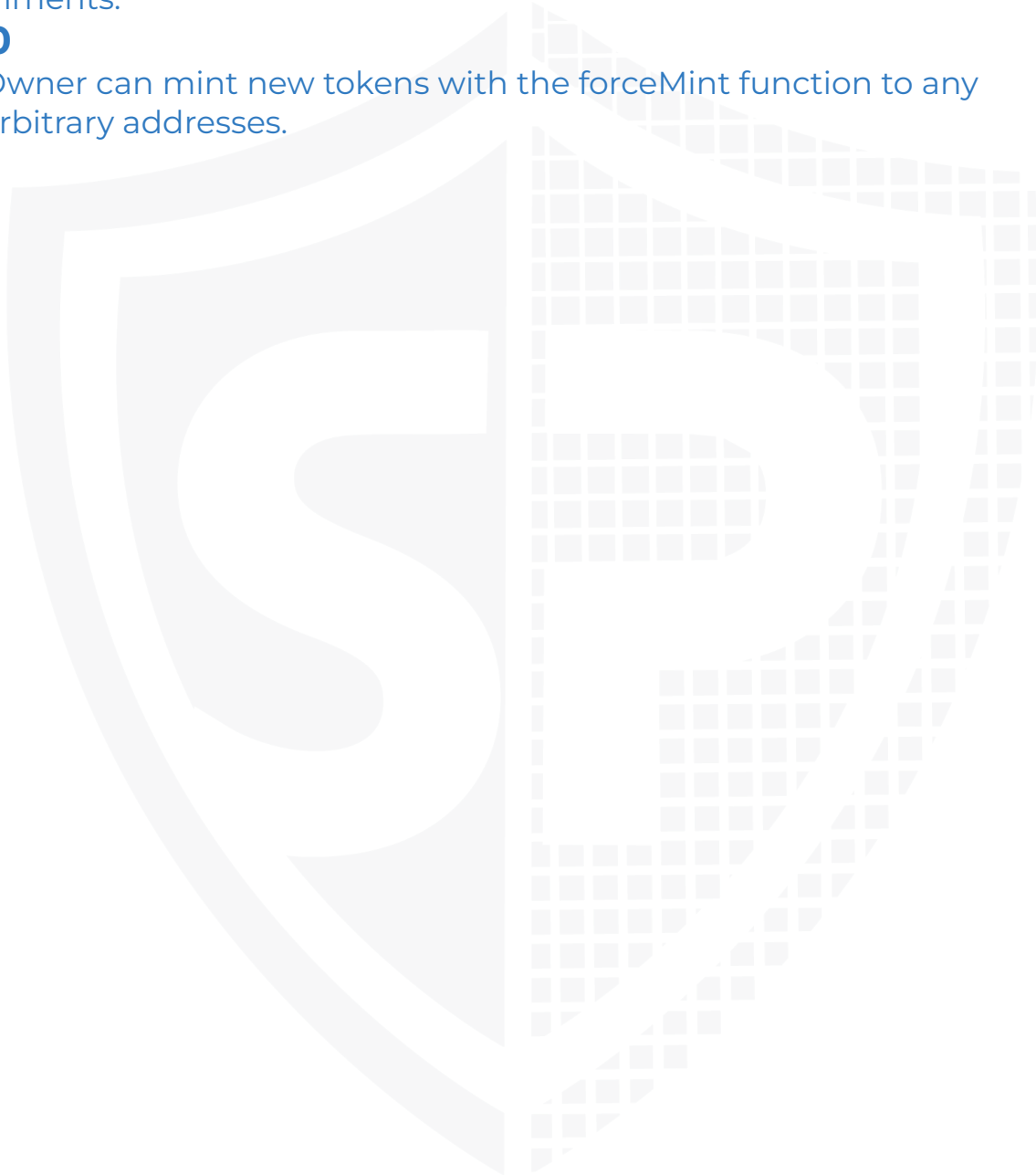
Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	✓	✓	✗

Comments:

v1.0

- Owner can mint new tokens with the forceMint function to any arbitrary addresses.



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	✓	✓	✗

Comments:

v1.0

- The owner can pause the mintWithUSDC and depositUSDC function. But keep in mind that the contract is an upgradeable contract that means that the deployer is able to add new functionalities to 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	—	—	—



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

✓	🔹	initialize	
	Ⓜ	initializer	
✓	🔹	createPresaleRound	
	Ⓜ	onlyOwner	
✓	🔹	<Constructor>	💰
	Ⓜ	whenNotPaused	
✓	🔹	mint	💰
	Ⓜ	whenNotPaused	
✓	🔹	deposit	💰
	Ⓜ	whenNotPaused	
✓	🔹	mintWithUSDC	
	Ⓜ	whenNotPaused	
✓	🔹	depositUSDC	
	Ⓜ	whenNotPaused	
✓	🔹	forceMint	
	Ⓜ	onlyOwner	
✓	🔹	approve	
	Ⓜ	onlyAllowedOperatorApproval	
✓	🔹	setApprovalForAll	
	Ⓜ	onlyAllowedOperatorApproval	
✓	🔹	transferFrom	
	Ⓜ	onlyAllowedOperator	
✓	🔹	safeTransferFrom	
	Ⓜ	onlyAllowedOperator	

Note: Functions from imported libraries were not listed here.

Comments

- Existing Modifiers
 - onlyAllowedOperator
 - onlyAllowedOperatorApproval
 - onlyOwner
 - whenNotPaused
 - initializer
- Owner can









- Create new presaleRounds
- Only allowed operators can approve

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/Vitreus.sol	1	————	401	366	288	6	265	  
	Totals	1	————	401	366	288	6	265	  

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

High issues found

Issue	File	Type	Line	Description	Status
#1	Main	USDC Receiver	115	If the msg.sender is the _usdcReceiver address the msg.sender is able to mint tokens for free. We recommend you to check whether the caller is the _usdcReceiver. Same for the deposit	Fixed
#2	Main	Initialize all the variables	35	_usdc is never initialized but the contract is calling the address. Initialize the variable in the "initialize" function as well.	Fixed
#3	Main	The owner is able to mint new tokens	284	The owner is able to mint new tokens. Also when the contract is paused. That means that the owner is excluded to mint new tokens.	Acknowledged

Medium issues

No medium issues

Low issues

Issue	File	Type	Line	Description	Status
#1	Main	A floating pragma is set	2	The current pragma Solidity directive is „^0.8.9“.	Fixed
#2	Main	Missing Zero Address Validation (missing-zero-check)	67	Check that the address is not zero	Fixed

#3	Main	State variable visibility is not set	30, 31, 33, 34, 35, 36, 51, 52, 57	It is best practice to set the visibility of state variables explicitly	Fixed
#4	Main	Local variables shadowing	354, 299, 360, 137, 201, 159, 207	Rename the local variables that shadow another component. We recommend you to modify "owner" to something similar like "owner_".	Fixed
#5	Main	Allocation can be set to 0	296	Since the allocation can be set to 0, the availableDeposit amount will be also 0 in L545, L640	Fixed

Informational issues

Issue	File	Type	Line	Description	Status
#1	Main	Functions that are not used	251, 304, 309	Remove unused functions. Before removing check the function, it could be possible, that you forget to implement it into the contract	Fixed
#2	Main	Unused state variables	30	Remove unused state variables	Fixed
#3	Main	Pause function	See description	The pause functionality is not implemented in the contract but the "whenPaused" modifier was used. Implement pause functionality for the owner only or remove the modifier.	Fixed
#4	Main	Misspelling	183	It is recommended to adjust the misspelling in the contract.	Fixed
#5	Main	Check for Zero value	195-199, 205, 212	Checking the msg.value is zero is recommended. Otherwise, the contract should not call the deposit/mint function in general.	Fixed

#6	Main	Disable initialize	140	<p>The disableInitializers function in the constructor should only be called after the first version of the upgradeable was deployed already. Otherwise the owner cannot call the “initialize” function.</p> <p>Make sure to implement this function back to the contract before updating the contract implementation.</p>	Fixed
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Audit Comments

20. June 2023:

- The owner can deploy a new version of the contract which can change any limit and give the owner new privileges
- Read the whole report and modifiers section for more information

SWC Attacks

ID	Title	Relationships	Status
SW C-1 36	Unencrypted Private Data On-Chain	CWE-767: Access to Critical Private Variable via Public Method	PASSED
SW C-1 35	Code With No Effects	CWE-1164: Irrelevant Code	PASSED
SW C-1 34	Message call with hardcoded gas amount	CWE-655: Improper Initialization	PASSED
SW C-1 33	Hash Collisions With Multiple Variable Length Arguments	CWE-294: Authentication Bypass by Capture-replay	PASSED
SW C-1 32	Unexpected Ether balance	CWE-667: Improper Locking	PASSED
SW C-1 31	Presence of unused variables	CWE-1164: Irrelevant Code	PASSED
SW C-1 30	Right-To-Left-Override control character (U+202E)	CWE-451: User Interface (UI) Misrepresentation of Critical Information	PASSED
SW C-1 29	Typographical Error	CWE-480: Use of Incorrect Operator	PASSED
SW C-1 28	DoS With Block Gas Limit	CWE-400: Uncontrolled Resource Consumption	PASSED

SW C-1 27	Arbitrary Jump with Function Type Variable	CWE-695: Use of Low-Level Functionality	PASSED
SW C-1 25	Incorrect Inheritance Order	CWE-696: Incorrect Behavior Order	PASSED
SW C-1 24	Write to Arbitrary Storage Location	CWE-123: Write-what-where Condition	PASSED
SW C-1 23	Requirement Violation	CWE-573: Improper Following of Specification by Caller	PASSED
SW C-1 22	Lack of Proper Signature Verification	CWE-345: Insufficient Verification of Data Authenticity	PASSED
SW C-1 21	Missing Protection against Signature Replay Attacks	CWE-347: Improper Verification of Cryptographic Signature	PASSED
SW C-1 20	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-11 1	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-1 09	Uninitialized Storage Pointer	CWE-824: Access of Uninitialized Pointer	PASSED
SW C-1 08	State Variable Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED
SW C-1 07	Reentrancy	CWE-841: Improper Enforcement of Behavioral Workflow	PASSED
SW C-1 06	Unprotected SELFDESTRUCT Instruction	CWE-284: Improper Access Control	PASSED

SW C-1 05	Unprotected Ether Withdrawal	CWE-284: Improper Access Control	PASSED
SW C-1 04	Unchecked Call Return Value	CWE-252: Unchecked Return Value	PASSED
SW C-1 03	Floating Pragma	CWE-664: Improper Control of a Resource Through its Lifetime	PASSED
SW C-1 02	Outdated Compiler Version	CWE-937: Using Components with Known Vulnerabilities	PASSED
SW C-1 01	Integer Overflow and Underflow	CWE-682: Incorrect Calculation	PASSED
SW C-1 00	Function Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED

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