Blockchain Security & Audits

Seculite

Blockchain Security Company

CareBig Token Audit

Security Assesment

24. January 2023

For

Seculite.net

SeculiteAudits

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Version	Date	Description
1.0	24 January 2023	• Layout project • Automated- /Manual-Security Testing • Summary

Network

Binance Smart Chain (BNB)

Website

https://carebigtoken.io

Description

TBA

Project Engagement

During the Date of 16 January 2023, **CareBig Team** engaged Seculite 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 Seculite with access to their code repository and whitepaper.

Logo

CAREBIG
TOKEN

Contract Link

v1.0

- Contract: https://github.com/MasterAtWork/carebig_smartcontracts/blob/CB-66/contracts/CareBigToken.sol
- Commit: cab976d8234de863b0d2b18ffb8e6e65e9cf9698TBA

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	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:
    a. Review of the specifications, sources, and instructions provided to Seculite to make sure we understand the size, scope, and functionality of the smart Contract.
    b. Manual review of code, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.
    c. Comparison to specification, which is the process of checking whether the code does what the specifications, sources, and instructions provided to Seculite describe.

2. Testing and automated analysis that includes the following:
    a. 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.
    b. 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, itemised, 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/token/ERC20/ERC20.sol	1
@openzeppelin/contracts/token/ERC20/extensions/ERC20Capped.sol	1
@openzeppelin/contracts/token/ERC20/extensions/ERC20Burnable.sol	1
@openzeppelin/contracts/security/Pausable.sol	1
@openzeppelin/contracts/access/AccessControl.sol	1

Tested Contract Files

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

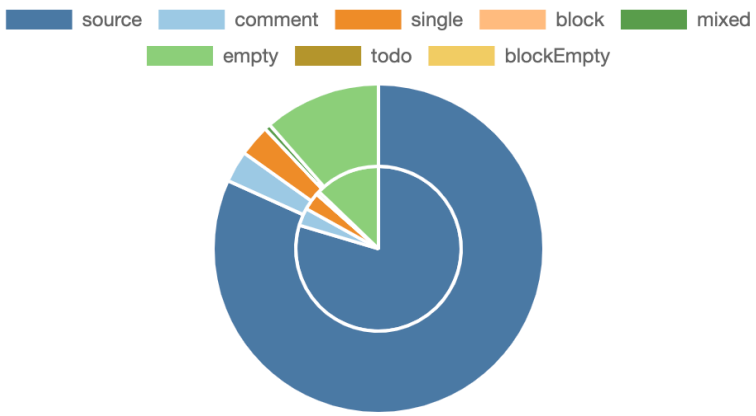
A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

File Name	SHA-1 Hash
contracts/CareBigToken.sol	c1e71ee5c0092f3e5967a1368060fb7778b5a448

Metrics

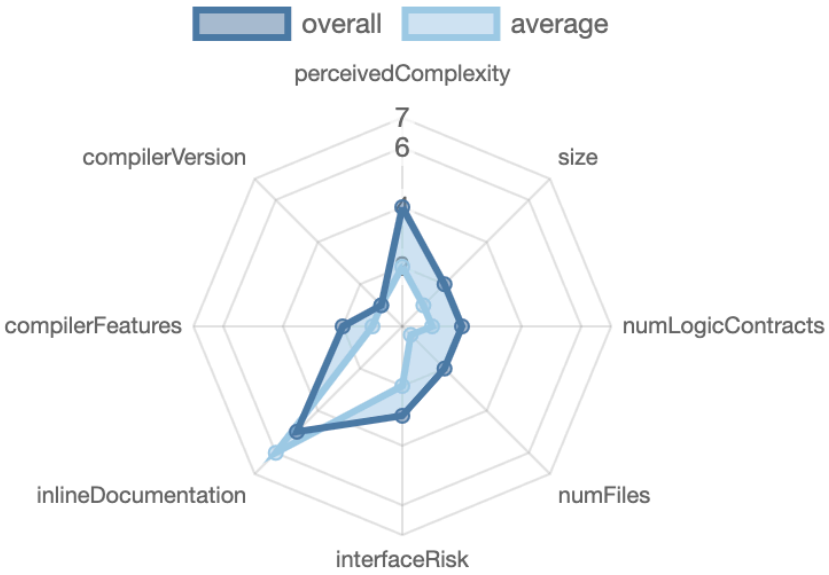
Source Lines

V 1.0



Risk Level

V 1.0



Capabilities

Contracts	Libraries	Interfaces	Abstract
1	0	0	0

Exposed Functions

This section lists functions that are explicitly declared public or private.

Public	Payable
9	0

External	Internal	Private	Pure	View
1	3	0	0	2

State Variables

Total	Public
7	5

Capabilities

Solidity Version observed	Experimental Features	Can Receive Funds	Uses Assembly
0.8.11	-	-	-

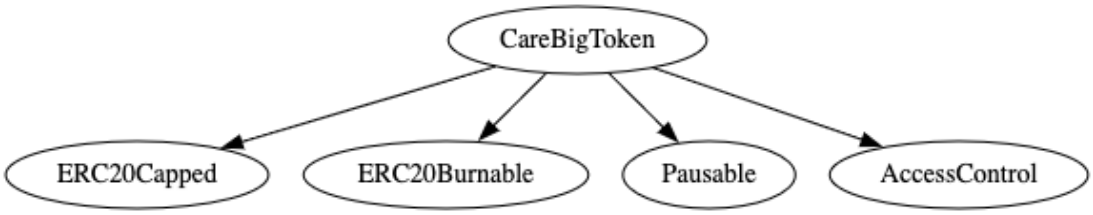
Has Destroyable Contracts	Transfer ETH	Low-level calls	DelegateCall
-	-	-	Yes

ECRecover	New/Create/Create2	TryCatch	Unchecked
-	-	-	-

Uses Hash Functions
Yes

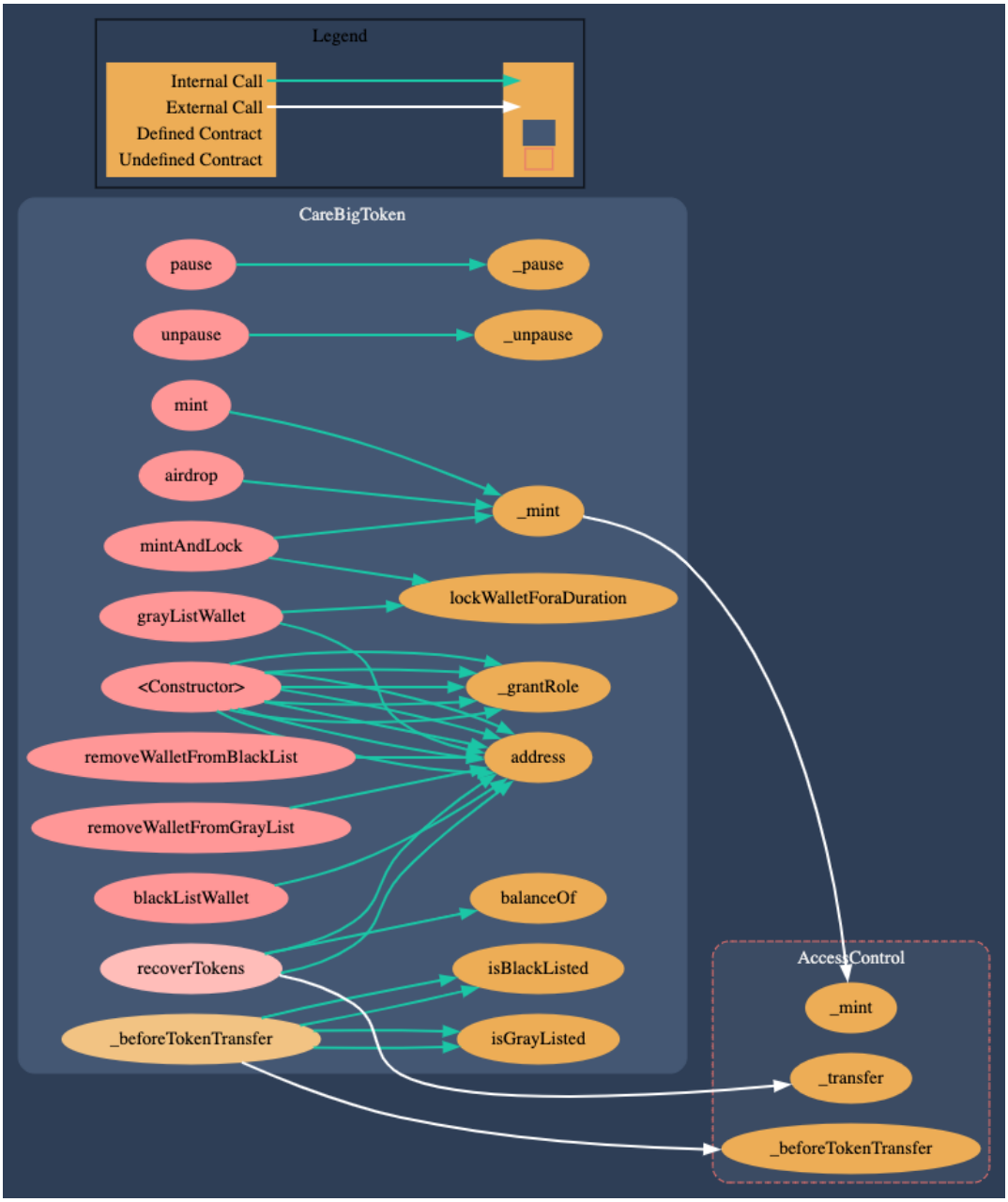
Inheritance Graph

V 1.0



CallGraph

V 1.0



Scope of Work/Verify Claims

The above token Team provided us with the files that needs to be tested(GitHub, Bscscan, Etherscan, les, 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	Answer
Is contract an upgradeable?	No

Correct implementation of Token standard

ERC20				
Function	**Description**	**Exist**	**Tested**	**Verified**
Total Supply	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

V 1.0

- pause
- unpause
- mint
- mintAndLock
- airdrop
- blackListWallet
- removeWalletFromBlackList
- grayListWallet
- removeWalletFromGrayList
- recoverTokens

Deployer cannot mint any new tokens

V 1.0

Name	Exist	Tested	Verified
Deployer cannot mint	✓	-	✗
Max / Total Supply	12.000.000.000		

Comments

V 1.0

The wallet with the “MINTER” can mint new tokens.

Deployer cannot burn or lock user funds

Name	Exist	Tested	Verified
Deployer can lock	✓	✓	✗
Deployer cannot burn	✓	✓	✓

Comments

V 1.0

The wallets with the roles “MINTER”, and “GUARD” can lock user funds by:

- blacklisting addresses
- Locking a wallet for any amount of time and tokens because there are no limitations on the amount of tokens and the time period

Deployer cannot pause the contract

Name	Exist	Tested	Verified
Deployer cannot pause	✓	✓	✗

Comments

V 1.0

The wallets with the roles “PAUSER” can pause the contracts.

Deployer cannot set

Name	Exist	Tested	Verified
Deployer cannot set fees over 25%	-	-	-
Deployer cannot set fees to nearly 100% or to 100%	-	-	-

Deployer can blacklist/antisnipe addresses

Name	Exist	Tested	Verified
Deployer cannot blacklist/antisnipe addresses	✓	✓	✗

Comments

V 1.0

The wallets with the roles “GUARD” can blacklist addresses. Moreover, they can also “grayList” users in which an users account will be locked for a certain amount of time but the amount of time can be set to any arbitrary value, which means the “GrayList” addresses can also be blocked permanently.

Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓

Legend

Attribute	Symbol
Verified / Checked	✓
Parity Verified	🚩
Unverified / Not Verified	✗
Not available	-

Modifiers and Public Functions

V 1.0

```
pause
onlyRole
unpause
onlyRole
mint
onlyRole
mintAndLock
onlyRole
airdrop
onlyRole
blackListWallet
onlyRole
removeWalletFromBlackList
onlyRole
grayListWallet
onlyRole
removeWalletFromGrayList
onlyRole
recoverTokens
onlyRole
```

Ownership/Authorised Addresses Privileges:

V 1.0

- There are several authorities which are authorized to call certain functions, that means, if the owner is renounced, another address is still authorized to call functions

- “MINTER” , and “GUARD” role can:
    - Airdrop tokens to any wallet at any point in time and the airdrop
    - tokens will be minted before being transferred
    - GUARD address can transfer any amount of tokens from whatever wallet they want. Thus, the function is named “RecoverTokens” but the actual functionality will allow the Authority wallet to transfer funds from any arbitrary user’s wallet to the wallet of their choosing

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

Source Units in Scope

V 1.0

File	Logic Contracts	Interfaces	Lines	nLines	nSOLC	Comment Lines	Complex. Score
Contracts/CareBigToken.sol	1	0	168	147	126	1	121
Total	1	0	168	147	126	1	121

Legend

V 1.0

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 Result

Critical issues

No critical issues

High issues

High risk found

Issue	File	Type	Line	Description
#1	CareBigToken.sol	Drain tokens from any address	157	The address with GUARD role can transfer funds from any wallet to any wallet because there is no restriction in place to check if the tokens are only being withdrawn from "Blacklisted" address. Due to the lack of checks, the function will allow the 'GUARD' address to drain tokens from all the user wallets without the need for approval because on L165 '_transfer' function is called directly which skips the approval check

Medium issues

No medium issues

Low issues

No low issues

Informational issues

No informational issues

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

Audit Comments

V 1.0

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.

SWC Attacks

ID	Title	Relationships	Status
SWC-136	Unencrypted Private Data On-Chain	CWE-767: Access to Critical Private Variable via Public Method	PASSED
SWC-135	Code With No Effects	CWE-1164: Irrelevant Code	PASSED
SWC-134	Message call with hardcoded gas amount	CWE-655: Improper Initialization	PASSED
SWC-133	Hash Collisions With Multiple Variable Length Arguments	CWE-294: Authentication Bypass by Capture-replay	PASSED
SWC-132	Unexpected Ether balance	CWE-667: Improper Locking	PASSED
SWC-131	Presence of unused variables	CWE-1164: Irrelevant Code	PASSED
SWC-130	Right-To-Left-Override control character (U+202E)	CWE-451: User Interface (UI) Misrepresentation of Critical Information	PASSED
SWC-129	Typographical Error	CWE-480: Use of Incorrect Operator	PASSED
SWC-128	DoS With Block Gas Limit	CWE-400: Uncontrolled Resource Consumption	PASSED
SWC-127	Arbitrary Jump with Function Type Variable	CWE-695: Use of Low-Level Functionality	PASSED
SWC-125	Incorrect Inheritance Order	CWE-696: Incorrect Behavior Order	PASSED
SWC-124	Write to Arbitrary Storage Location	CWE-123: Write-what-where Condition	PASSED
SWC-123	Requirement Violation	CWE-573: Improper Following of Specification by Caller	PASSED
SWC-122	Lack of Proper Signature Verification	CWE-345: Insufficient Verification of Data Authenticity	PASSED
SWC-121	Missing Protection against Signature Replay Attacks	CWE-347: Improper Verification of Cryptographic Signature	PASSED
SWC-120	Weak Sources of Randomness from Chain Attributes	CWE-330: Use of Insufficiently Random Values	PASSED
SWC-119	Shadowing State Variables	CWE-710: Improper Adherence to Coding Standards	PASSED
SWC-118	Incorrect Constructor Name	CWE-665: Improper Initialization	PASSED
SWC-117	Signature Malleability	CWE-347: Improper Verification of Cryptographic Signature	PASSED

SWC-116	Timestamp Dependence	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SWC-115	Authorization through tx.origin	CWE-477: Use of Obsolete Function	PASSED
SWC-114	Transaction Order Dependence	CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')	PASSED
SWC-113	DoS with Failed Call	CWE-703: Improper Check or Handling of Exceptional Conditions	PASSED
SWC-112	Delegatecall to Untrusted Callee	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SWC-111	Use of Deprecated Solidity Functions	CWE-477: Use of Obsolete Function	PASSED
SWC-110	Assert Violation	CWE-670: Always-Incorrect Control Flow Implementation	PASSED
SWC-109	Uninitialized Storage Pointer	CWE-824: Access of Uninitialized Pointer	PASSED
SWC-108	State Variable Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED
SWC-107	Reentrancy	CWE-841: Improper Enforcement of Behavioral Workflow	PASSED
SWC-106	Unprotected SELFDESTRUC T Instruction	CWE-284: Improper Access Control	PASSED
SWC-105	Unprotected Ether Withdrawal	CWE-284: Improper Access Control	PASSED
SWC-104	Unchecked Call Return Value	CWE-252: Unchecked Return Value	PASSED
SWC-103	Floating Pragma	CWE-664: Improper Control of a Resource Through its Lifetime	PASSED
SWC-102	Outdated Compiler Version	CWE-937: Using Components with Known Vulnerabilities	PASSED
SWC-101	Integer Overflow and Underflow	CWE-682: Incorrect Calculation	PASSED
SWC-100	Function Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED

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