

Audit Report

CIrs Presale

April 2023

SHA256

a70c5e57f04cd95793386cdca7a5ce148b6751d9e7d98983ccefe1a55146b880

Audited by © cyberscope



Table of Contents

| Table of Contents | 1 |
|--|----|
| Review | 3 |
| Audit Updates | 3 |
| Source Files | 3 |
| Introduction | 4 |
| Functionality | 4 |
| Findings Breakdown | 6 |
| Diagnostics | 7 |
| PMI - Presale Mechanism Inconsistency | 9 |
| Description | 9 |
| Recommendation | 9 |
| MSC - Missing Sanity Check | 10 |
| Description | 10 |
| Recommendation | 11 |
| PTD - Presale Token Drain | 12 |
| Description | 12 |
| Recommendation | 12 |
| MPPC - Missing Purchase Prevalidation Check | 13 |
| Description | 13 |
| Recommendation | 14 |
| VO - Variable Optimization | 15 |
| Description | 15 |
| Recommendation | 15 |
| CI - Calculation Inconsistency | 16 |
| Description | 16 |
| Recommendation | 16 |
| MRPC - Missing Refund Prevalidation Check | 17 |
| Description | 17 |
| Recommendation | 17 |
| MSE - Missing Solidity Events | 18 |
| Description | 18 |
| Recommendation | 18 |
| RSML - Redundant SafeMath Library | 19 |
| Description | 19 |
| Recommendation | 19 |
| IDI - Immutable Declaration Improvement | 20 |
| Description | 20 |
| Recommendation | 20 |
| L04 - Conformance to Solidity Naming Conventions | 21 |



| Description | 21 |
|------------------------------------|----|
| Recommendation | 21 |
| L07 - Missing Events Arithmetic | 23 |
| Description | 23 |
| Recommendation | 23 |
| L09 - Dead Code Elimination | 24 |
| Description | 24 |
| Recommendation | 25 |
| L11 - Unnecessary Boolean equality | 26 |
| Description | 26 |
| Recommendation | 26 |
| L16 - Validate Variable Setters | 27 |
| Description | 27 |
| Recommendation | 27 |
| L17 - Usage of Solidity Assembly | 28 |
| Description | 28 |
| Recommendation | 28 |
| Functions Analysis | 29 |
| Inheritance Graph | 33 |
| Flow Graph | 34 |
| Summary | 35 |
| Disclaimer | 36 |
| About Cyberscope | 37 |



Review

| Testing Deploy | https://testnet.bscscan.com/address/0x2b675b486a2381384abf |
|----------------|--|
| | b41ee135d06d9093e628 |

Audit Updates

| Initial Audit | 18 Apr 2023 |
|---------------|-------------|
|---------------|-------------|

Source Files

| Filename | SHA256 |
|--------------------------|--|
| contracts/CLRSPresale.so | a70c5e57f04cd95793386cdca7a5ce148b6751d9e7d98983ccefe1a551 46b880 |

Introduction

The CLRSPresale smart contract implements a presale contract for a token.

The contract defines several state variables

- __contributions , which is a mapping of addresses to the amount of ether contributed by each address; _token, which is the token being sold.
- __tokenDecimals , which is the number of decimals of the token; _wallet, which is the address that will receive the funds raised; _rate, which is the number of tokens that can be purchased for each wei of ether;
- weiRaised, which is the total amount of wei raised.
- endICO, which is the end time of the pre-sale event.
- minPurchase, which is the minimum amount of ether that can be purchased by a user.
- maxPurchase, which is the maximum amount of ether that can be contributed by an address.
- hardCap, which is the maximum amount of ether that can be raised.
- softCap , which is the minimum amount of ether that needs to be raised.
- availableTokensICO, which is the number of tokens available for sale during the pre-sale event.
- startRefund, which is a boolean flag indicating whether a refund process has started.
- refundStartDate, which is the start time of the refund process.

Functionality

The startICO function is used to start the pre-sale event with the necessary arguments.

The stopICO function is used to stop the pre-sale event. If the soft cap has been reached, the funds raised are transferred to the wallet address. Otherwise, the startRefund flag is set to true, and the refundStartDate is set to the current time.

The buyTokens function is used to purchase tokens during the pre-sale event. It performs the necessary check to validate that the purchase is valid. Then the number of tokens purchased is calculated based on the __rate_ and __tokenDecimals variables, the necessary updates are taking place, and the __TokensPurchased event is emitted.



The claimTokens function is used to claim tokens after the pre-sale event has ended. If the presale is in the correct valid state, the number of tokens purchased by the sender is calculated. The necessary state variables are updated. Finally, the tokens are transferred to the sender, and the TokensClaimed event is emitted.

The withdraw function is accessible by the owner to withdraw the ether raised during the pre-sale event. If the startRefund flag is false, and either the refund period has ended or no refunds have been requested, the ethers are transferred to the wallet address, and 5% of the ether are transferred to a specific address.



Findings Breakdown



| Severity | Unresolved | Acknowledged | Resolved | Other |
|----------------------------|------------|--------------|----------|-------|
| Critical | 2 | 0 | 0 | 0 |
| Medium | 2 | 0 | 0 | 0 |
| Minor / Informative | 12 | 0 | 0 | 0 |



Diagnostics

CriticalMediumMinor / Informative

| Severity | Code | Description | Status |
|----------|------|--|------------|
| • | PMI | Presale Mechanism Inconsistency | Unresolved |
| • | MSC | Missing Sanity Check | Unresolved |
| • | PTD | Presale Token Drain | Unresolved |
| • | MPPC | Missing Purchase Prevalidation Check | Unresolved |
| • | VO | Variable Optimization | Unresolved |
| • | CI | Calculation Inconsistency | Unresolved |
| • | MRPC | Missing Refund Prevalidation Check | Unresolved |
| • | MSE | Missing Solidity Events | Unresolved |
| • | RSML | Redundant SafeMath Library | Unresolved |
| • | IDI | Immutable Declaration Improvement | Unresolved |
| • | L04 | Conformance to Solidity Naming Conventions | Unresolved |
| • | L07 | Missing Events Arithmetic | Unresolved |
| • | L09 | Dead Code Elimination | Unresolved |
| • | L11 | Unnecessary Boolean equality | Unresolved |



| • | L16 | Validate Variable Setters | Unresolved |
|---|-----|----------------------------|------------|
| • | L17 | Usage of Solidity Assembly | Unresolved |



PMI - Presale Mechanism Inconsistency

| Criticality | Critical |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L461 |
| Status | Unresolved |

Description

The presale mechanism in the contract should have consistent parameters that are fixed and cannot be modified by the owner once the presale has started. All parameters, including the available token amount, should be set before the start of the presale to ensure consistency and fairness for all investors.

```
function setAvailableTokens(uint256 amount) public onlyOwner
icoNotActive{
    availableTokensICO = amount;
    emit AvailableTokenUpdated(amount);
}
```

Recommendation

It is recommended to have fixed availableTokensICO presale parameter before the start of the presale and prevent the owner from modifying it once the presale has started.



MSC - Missing Sanity Check

| Criticality | Critical |
|-------------|--|
| Location | contracts/CLRSPresale.sol#L456,461,475,480,484 |
| Status | Unresolved |

Description

The contract is processing variables that have not been properly sanitized and checked that they form the proper shape. These variables may produce vulnerability issues.

The __rate variable could be set to zero and prevent users from taking tokens on the purchase transaction.

```
function setRate(uint256 newRate) external onlyOwner icoNotActive {
    _rate = newRate;
    emit RateUpdated(newRate);
}
```

The min purchase value can be set to values greater than the max purchase value and to zero.

```
function setMinPurchase(uint256 value) external onlyOwner{
   minPurchase = value;
   emit MinPurchaseUpdated(value);
}
```

The max purchase amount could be set to values lower than the min purchase amount.

```
function setMaxPurchase(uint256 value) external onlyOwner{
   maxPurchase = value;
   emit MaxPurchaseUpdated(value);
}
```

The hard cap could be set to values lower than the soft cap.

```
function setHardCap(uint256 value) external onlyOwner{
   hardCap = value;
   emit HardCapUpdated(value);
}
```



The soft value could be set to values greater than the hard cap.

```
function setSoftCap(uint256 value) external onlyOwner {
    softCap = value;
}
```

Recommendation

The team is advised to properly check the variables according to the required specifications.

- The softCap variable should exceed the hard cap.
- The rate variable should be greater than zero.
- The maxPurchase variable should be lower than or equal to hardCap .

The following requirements are used in the contract's implementation. The contract should re-apply the following requirements to the related setter functions.

- require(_softCap < _hardCap, "Softcap must be lower than Hardcap");
- require(_minPurchase < _maxPurchase, "minPurchase must be lower than maxPurchase");
- require(minPurchase > 0, ' minPurchase should > 0');



PTD - Presale Token Drain

| Criticality | Medium |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L494 |
| Status | Unresolved |

Description

The contract currently allows the owner to withdraw tokens from the presale contract, which can lead to a reduction in the amount of tokens available for sale during the presale period. This can result in a loss of funds for investors who have already purchased tokens during the presale.

```
function takeTokens(IERC20 tokenAddress)    public onlyOwner
icoNotActive {
    IERC20 tokenBEP = tokenAddress;
    uint256 tokenAmt = tokenBEP.balanceOf(address(this));
    require(tokenAmt > 0, 'BEP-20 balance is 0');
    tokenBEP.safeTransfer(_wallet, tokenAmt);
}
```

Recommendation

It is recommended to remove functionality that allows the contract owner to withdraw tokens from the presale contract. The presale contract should only allow for token purchases by investors and the contract owner should not have the ability to interfere with the presale process.



MPPC - Missing Purchase Prevalidation Check

| Criticality | Medium |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L419 |
| Status | Unresolved |

Description

The contract allows users to buy tokens despite the issuance of a refund, which can lead to investors making invalid purchases and potential loss of funds.

```
function preValidatePurchase(
   address beneficiary,
    uint256 weiAmount
  ) internal view {
    require(
      beneficiary != address(0),
      "Crowdsale: beneficiary is the zero address"
    require(weiAmount != 0, "Crowdsale: weiAmount is 0");
    require(weiAmount >= minPurchase, "have to send at least:
minPurchase");
    require(
      _contributions[beneficiary].add(weiAmount) <=
maxPurchase,
      "can't buy more than: maxPurchase"
   require(( weiRaised + weiAmount) <= hardCap, "Hard Cap</pre>
reached");
   this;
```

The contract allows the users to buy tokens even if there are not enough tokens for purchase.



```
function buyTokens(address beneficiary) public nonReentrant
icoActive payable {
    ...
    availableTokensICO = availableTokensICO - tokens;
    ...
}
```

Recommendation

It is recommended to add two extra pre-validation requirements in the token purchase function.

- Checking the startRefund , to prevent invalid purchases.
- Checking if there are enough available tokens for purchase.



VO - Variable Optimization

| Criticality | Minor / Informative |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L363 |
| Status | Unresolved |

Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The variable tokenDecimals is represented in uint256. The corresponding number will never exceed the value of 18, then the implementation of the contract does not necessarily require the use of a uint256 data type.

```
constructor (uint256 rate, address payable wallet, IERC20 token,
uint256 tokenDecimals) {
    ...
    _tokenDecimals = 18 - tokenDecimals;
}
```

Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

The variable tokenDecimals could be represented to uint8.



CI - Calculation Inconsistency

| Criticality | Minor / Informative |
|-------------|------------------------------------|
| Location | contracts/CLRSPresale.sol#L413,414 |
| Status | Unresolved |

Description

The contract performs calculations using two different methods, either native calculations or the SafeMath library, which can make it difficult to read and understand. This inconsistency may also introduce errors or vulnerabilities in the contract's logic.

```
_weiRaised = _weiRaised.add(weiAmount);
availableTokensICO = availableTokensICO - tokens;
```

Recommendation

It is recommended to use native calculations since the contract is compiled using a version of Solidity greater than 0.8.0. The compiler performs calculation checks to prevent overflows and underflows, making it safe to use native calculations. This will make the code simpler and easier to read and understand.



MRPC - Missing Refund Prevalidation Check

| Criticality | Minor / Informative |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L501 |
| Status | Unresolved |

Description

The contract attempts to refund a user without verifying if the contract has enough balance to refund the user or if the user has any other contribution to refund.

```
function refundMe() public icoNotActive nonReentrant {
    require(startRefund == true, 'no refund available');
    require(msg.sender != address(0));
    uint amount = _contributions[msg.sender];
    if (address(this).balance >= amount) {
        _contributions[msg.sender] = 0;
        if (amount > 0) {
            address payable recipient = payable(msg.sender);
            recipient.transfer(amount);
            emit Refund(msg.sender, amount);
        }
    }
}
```

Recommendation

It is recommended to add pre-validation checks with require statements when attempting to refund a user. The checks should verify that the contract has enough balance to refund the user and that the user has contributions to refund. If either of these conditions are not met, the contract should revert with a clear error message indicating the reason for the revert.



MSE - Missing Solidity Events

| Criticality | Minor / Informative |
|-------------|--|
| Location | contracts/CLRSPresale.sol#L429,446,471,503 |
| Status | Unresolved |

Description

The contract has some actions that a user can take on the contract that do not emit any events. Emitting events for significant actions is important as it allows external parties, such as wallets or dApps, to track and monitor the activity on the contract. Without these events, it may be difficult for external parties to accurately determine the current state of the contract.

```
require(startRefund == false);
require(startRefund == false || (refundStartDate + 3 days) <
block.timestamp);
require(_wallet != address(0));
require(msg.sender != address(0));</pre>
```

Recommendation

It is recommended adding events to the code that are emitted whenever a user interacts with the contract in a significant way. These events should include relevant details such as the user's address and the nature of the action taken. By doing so, the contract will be more transparent and easily auditable by external parties. It will also help prevent potential issues or disputes that may arise in the future.



RSML - Redundant SafeMath Library

| Criticality | Minor / Informative |
|-------------|---------------------------|
| Location | contracts/CLRSPresale.sol |
| Status | Unresolved |

Description

SafeMath is a popular Solidity library that provides a set of functions for performing common arithmetic operations in a way that is resistant to integer overflows and underflows.

Starting with Solidity versions that are greater than or equal to 0.8.0, the arithmetic operations revert on underflow and overflow. As a result, the native functionality of the Solidity operations replaces the SafeMath library. Hence, the usage of the SafeMath library adds complexity, overhead and increases the gas consumption unnecessarily.

```
library SafeMath {...}
```

Recommendation

The team is advised to remove the SafeMath library. Since the version of the contract is greater than 0.8.0 then the pure Solidity arithmetic operations produce the same result.

If the previous functionality is required, then the contract could exploit the unchecked { ... } statement.

Read more about the breaking change on https://docs.soliditylang.org/en/v0.8.16/080-breaking-changes.html#solidity-v0-8-0-breaking-changes.



IDI - Immutable Declaration Improvement

| Criticality | Minor / Informative |
|-------------|------------------------------------|
| Location | contracts/CLRSPresale.sol#L362,363 |
| Status | Unresolved |

Description

The contract is using variables that initialize them only in the constructor. The other functions are not mutating the variables. These variables are not defined as <code>immutable</code>.

```
_token
_tokenDecimals
```

Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.



L04 - Conformance to Solidity Naming Conventions

| Criticality | Minor / Informative |
|-------------|--|
| Location | contracts/CLRSPresale.sol#L310,330,332,334,335,336,379 |
| Status | Unresolved |

Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

- 1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
- 2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
- Use uppercase for constant variables and enums (e.g., MAX_VALUE, ERROR_CODE).
- 4. Use indentation to improve readability and structure.
- 5. Use spaces between operators and after commas.
- 6. Use comments to explain the purpose and behavior of the code.
- 7. Keep lines short (around 120 characters) to improve readability.

```
function DOMAIN_SEPARATOR() external view returns (bytes32);
mapping (address => uint256) public _contributions

IERC20 public _token
address payable public _wallet
uint256 public _rate
uint256 public _weiRaised
uint _hardCap
uint _maxPurchase
uint _minPurchase
uint _softCap
```

Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation

https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.



L07 - Missing Events Arithmetic

| Criticality | Minor / Informative |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L388 |
| Status | Unresolved |

Description

Events are a way to record and log information about changes or actions that occur within a contract. They are often used to notify external parties or clients about events that have occurred within the contract, such as the transfer of tokens or the completion of a task.

It's important to carefully design and implement the events in a contract, and to ensure that all required events are included. It's also a good idea to test the contract to ensure that all events are being properly triggered and logged.

endICO = endDate

Recommendation

By including all required events in the contract and thoroughly testing the contract's functionality, the contract ensures that it performs as intended and does not have any missing events that could cause issues with its arithmetic.



L09 - Dead Code Elimination

| Criticality | Minor / Informative |
|-------------|---|
| Location | contracts/CLRSPresale.sol#L141,148,160,175,179,188,192,217,248,252, 260,265,274 |
| Status | Unresolved |

Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.



```
function sendValue(address payable recipient, uint256 amount)
internal {
    require(address(this).balance >= amount, "Address:
insufficient balance");

    (bool success, ) = recipient.call{value: amount}("");
    require(success, "Address: unable to send value,
recipient may have reverted");
   }

function functionCall(address target, bytes memory data)
internal returns (bytes memory) {
    return functionCallWithValue(target, data, 0, "Address:
low-level call failed");
   }

function functionCallWithValue(address target, bytes memory
data, uint256 value) internal returns (bytes memory) {
    return functionCallWithValue(target, data, value,
"Address: low-level call with value failed");
   }
...
```

Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.



L11 - Unnecessary Boolean equality

| Criticality | Minor / Informative |
|-------------|--|
| Location | contracts/CLRSPresale.sol#L429,446,502 |
| Status | Unresolved |

Description

Boolean equality is unnecessary when comparing two boolean values. This is because a boolean value is either true or false, and there is no need to compare two values that are already known to be either true or false.

it's important to be aware of the types of variables and expressions that are being used in the contract's code, as this can affect the contract's behavior and performance. The comparison to boolean constants is redundant. Boolean constants can be used directly and do not need to be compared to true or false.

```
require(startRefund == false)
require(startRefund == false || (refundStartDate + 3 days) <
block.timestamp)
require(startRefund == true, 'no refund available')</pre>
```

Recommendation

Using the boolean value itself is clearer and more concise, and it is generally considered good practice to avoid unnecessary boolean equalities in Solidity code.

L16 - Validate Variable Setters

| Criticality | Minor / Informative |
|-------------|------------------------------------|
| Location | contracts/CLRSPresale.sol#L472,509 |
| Status | Unresolved |

Description

The contract performs operations on variables that have been configured on user-supplied input. These variables are missing of proper check for the case where a value is zero. This can lead to problems when the contract is executed, as certain actions may not be properly handled when the value is zero.

```
_wallet = newWallet recipient.transfer(amount)
```

Recommendation

By adding the proper check, the contract will not allow the variables to be configured with zero value. This will ensure that the contract can handle all possible input values and avoid unexpected behavior or errors. Hence, it can help to prevent the contract from being exploited or operating unexpectedly.

L17 - Usage of Solidity Assembly

| Criticality | Minor / Informative |
|-------------|--------------------------------|
| Location | contracts/CLRSPresale.sol#L231 |
| Status | Unresolved |

Description

Using assembly can be useful for optimizing code, but it can also be error-prone. It's important to carefully test and debug assembly code to ensure that it is correct and does not contain any errors.

Some common types of errors that can occur when using assembly in Solidity include Syntax, Type, Out-of-bounds, Stack, and Revert.

```
assembly {
    let returndata_size := mload(returndata)
    revert(add(32, returndata), returndata_size)
}
```

Recommendation

It is recommended to use assembly sparingly and only when necessary, as it can be difficult to read and understand compared to Solidity code.



Functions Analysis

| Contract | Туре | Bases | | |
|---------------------|-------------------|------------|------------|-----------|
| | Function Name | Visibility | Mutability | Modifiers |
| | | | | |
| Context | Implementation | | | |
| | _msgSender | Internal | | |
| | | | | |
| Ownable | Implementation | Context | | |
| | | Public | ✓ | - |
| | owner | Public | | - |
| | transferOwnership | Public | ✓ | onlyOwner |
| | | | | |
| ReentrancyGua rd | Implementation | | | |
| | | Public | ✓ | - |
| | | | | |
| SafeMath | Library | | | |
| | add | Internal | | |
| | sub | Internal | | |
| | sub | Internal | | |
| | mul | Internal | | |
| | div | Internal | | |
| | div | Internal | | |



| | mod | Internal | | |
|-----------|----------------------------|----------|---|--|
| | mod | Internal | | |
| | | | | |
| Address | Library | | | |
| | isContract | Internal | | |
| | sendValue | Internal | ✓ | |
| | functionCall | Internal | ✓ | |
| | functionCall | Internal | 1 | |
| | functionCallWithValue | Internal | 1 | |
| | functionCallWithValue | Internal | 1 | |
| | functionStaticCall | Internal | | |
| | functionStaticCall | Internal | | |
| | functionDelegateCall | Internal | 1 | |
| | functionDelegateCall | Internal | 1 | |
| | verifyCallResultFromTarget | Internal | | |
| | verifyCallResult | Internal | | |
| | _revert | Private | | |
| | | | | |
| SafeERC20 | Library | | | |
| | safeTransfer | Internal | 1 | |
| | safeTransferFrom | Internal | 1 | |
| | safeApprove | Internal | 1 | |
| | safeIncreaseAllowance | Internal | 1 | |

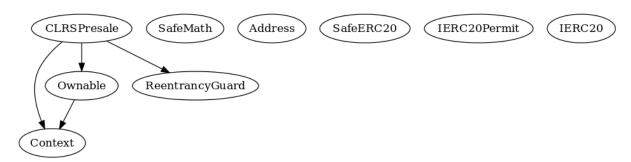


| | safeDecreaseAllowance | Internal | ✓ | |
|--------------|-----------------------|---|---------|---------------------------|
| | safePermit | Internal | ✓ | |
| | _callOptionalReturn | Private | ✓ | |
| | | | | |
| IERC20Permit | Interface | | | |
| | permit | External | ✓ | - |
| | nonces | External | | - |
| | DOMAIN_SEPARATOR | External | | - |
| | | | | |
| IERC20 | Interface | | | |
| | totalSupply | External | | - |
| | balanceOf | External | | - |
| | transfer | External | ✓ | - |
| | allowance | External | | - |
| | approve | External | 1 | - |
| | transferFrom | External | ✓ | - |
| | | | | |
| CLRSPresale | Implementation | ReentrancyG uard, Context, Ownable | | |
| | | Public | ✓ | - |
| | | External | Payable | - |
| | startICO | External | 1 | onlyOwner icoNotActive |
| | stopICO | External | 1 | onlyOwner icoActive |



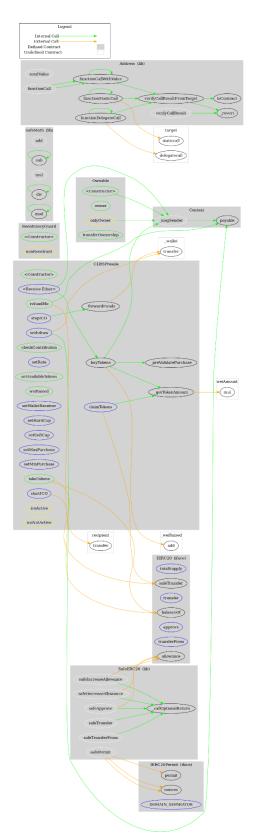
| buyTokens | Public | Payable | nonReentrant icoActive |
|----------------------|----------|---------|------------------------------|
| _preValidatePurchase | Internal | | |
| claimTokens | External | ✓ | icoNotActive nonReentrant |
| _getTokenAmount | Internal | | |
| _forwardFunds | Internal | ✓ | |
| withdraw | External | ✓ | onlyOwner icoNotActive |
| checkContribution | Public | | - |
| setRate | External | ✓ | onlyOwner icoNotActive |
| setAvailableTokens | Public | ✓ | onlyOwner icoNotActive |
| weiRaised | Public | | - |
| setWalletReceiver | External | ✓ | onlyOwner |
| setHardCap | External | ✓ | onlyOwner |
| setSoftCap | External | ✓ | onlyOwner |
| setMaxPurchase | External | ✓ | onlyOwner |
| setMinPurchase | External | ✓ | onlyOwner |
| takeTokens | Public | ✓ | onlyOwner icoNotActive |
| refundMe | Public | ✓ | icoNotActive nonReentrant |

Inheritance Graph





Flow Graph



Summary

ObeseFans Calories contract implements a presale mechanism. This audit investigates security issues, business logic concerns, and potential improvements.

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Blockchain technology and cryptographic assets present a high level of ongoing risk Cyberscope's position is that each company and individual are responsible for their own due diligence and continuous security Cyberscope's goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies and in no way claims any guarantee of security or functionality of the technology we agree to analyze. The assessment services provided by Cyberscope are subject to dependencies and are under continuing development. You agree that your access and/or use including but not limited to any services reports and materials will be at your sole risk on an as-is where-is and as-available basis Cryptographic tokens are emergent technologies and carry with them high levels of technical risk and uncertainty. The assessment reports could include false positives false negatives and other unpredictable results. The services may access and depend upon multiple layers of third parties.



About Cyberscope

Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

