Cyberscope

Audit Report

V8COIN

January 2025

Network	ETH
Address	0x98f1154d2e8d3a3c3aa4f2770ac6c281999c4180
Audited by	© cyberscope

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Risk Classification

The criticality of findings in Cyberscope's smart contract audits is determined by evaluating multiple variables. The two primary variables are:

1. **Likelihood of Exploitation**: This considers how easily an attack can be executed, including the economic feasibility for an attacker.
2. **Impact of Exploitation**: This assesses the potential consequences of an attack, particularly in terms of the loss of funds or disruption to the contract's functionality.

Based on these variables, findings are categorized into the following severity levels:

1. **Critical**: Indicates a vulnerability that is both highly likely to be exploited and can result in significant fund loss or severe disruption. Immediate action is required to address these issues.
2. **Medium**: Refers to vulnerabilities that are either less likely to be exploited or would have a moderate impact if exploited. These issues should be addressed in due course to ensure overall contract security.
3. **Minor**: Involves vulnerabilities that are unlikely to be exploited and would have a minor impact. These findings should still be considered for resolution to maintain best practices in security.
4. **Informative**: Points out potential improvements or informational notes that do not pose an immediate risk. Addressing these can enhance the overall quality and robustness of the contract.

Severity	Likelihood / Impact of Exploitation
Critical	Highly Likely / High Impact
Medium	Less Likely / High Impact or Highly Likely/ Lower Impact
Minor / Informative	Unlikely / Low to no Impact

Review

Explorer	https://etherscan.io/address/0x98f1154d2e8d3a3c3aa4f2770ac6c281999c4180

Audit Updates

Initial Audit	23 Dec 2024 https://github.com/cyberscope-io/audits/blob/main/v8/v1/airdropClaim.pdf
Corrected Phase 2	27 Jan 2025 https://github.com/cyberscope-io/audits/blob/main/v8/v2/airdropClaim.pdf
Corrected Phase 3	29 Jan 2025 https://github.com/cyberscope-io/audits/blob/main/v8/v3/airdropClaim.pdf
Corrected Phase 4	30 Jan 2025

Source Files

Filename	SHA256
contracts/V8COINAirdropClaim.sol	1b239c8a1af11deb9803bda5fe3b65027271768769e42bcdcc4b4129056c48af

Overview

The V8COINAirdropClaim contract is designed to facilitate and manage token airdrop claims with a focus on security and efficiency. It allows eligible users to claim rewards by validating their claims through a Merkle proof mechanism while enforcing strict role-based access controls for administrative functions. The contract also supports flexible management of airdrop sessions, claim fees, and rewards.

Claim Functionality

The claim functionality is the core of the contract, enabling users to securely receive airdrop rewards by providing a valid Merkle proof to prove their eligibility. The `claimReward` function ensures that each claim is valid by verifying the user's proof against the current Merkle root. Users are required to pay a predefined claim fee (`claimFeeAmount`), which is transferred to the designated `CLAIM_FEE_RECEIVER` , ensuring proper fee handling. All users receive the same fixed reward amount of V8COIN tokens, which are transferred to the specified receiver address upon successful claim validation. Claims can only be made during active airdrop sessions, defined by the `claimSessionStart` and `claimSessionEnd` timestamps.

Roles

Admin

The admin can interact with the following functions:

- `setRoot`
- `rescueERC20`
- `updateClaimFeeAmount`

AIRDROP_SESSION_OPENER_ROLE

The AIRDROP_SESSION_OPENER_ROLE can interact with the following functions:

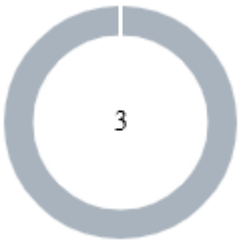
- `openAirdropSessionNow`
- `openAirdropSessionAt`

Users

The users can interact with the following functions:

- `claimReward`
- `isAirdropSessionOpen`
- `claimSessionStartHuman`
- `claimSessionEndHuman`
- `isProofValid`

Findings Breakdown



Critical	0
Medium	0
Minor / Informative	3

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	0	0	0	0
Minor / Informative	0	3	0	0

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
	TSI	Tokens Sufficiency Insurance	Acknowledged
	MPC	Merkle Proof Centralization	Acknowledged
	CCR	Contract Centralization Risk	Acknowledged

TSI - Tokens Sufficiency Insurance

Criticality	Minor / Informative
Location	contracts/V8AirdropClaim.sol#L171
Status	Acknowledged

Description

The tokens are not held within the contract itself. Instead, the contract is designed to provide the tokens from an external administrator. While external administration can provide flexibility, it introduces a dependency on the administrator's actions, which can lead to various issues and centralization risks.

```
uint256 rewardAmountCache = REWARD_AMOUNT;
V8COIN.safeTransfer(receiver, rewardAmountCache);
```

Recommendation

It is recommended to consider implementing a more decentralized and automated approach for handling the contract tokens. One possible solution is to hold the tokens within the contract itself. If the contract guarantees the process it can enhance its reliability, security, and participant trust, ultimately leading to a more successful and efficient process.

Team Update

The team has acknowledged that this is not a security issue and states: *This is by design. We want the airdrop contract to hold a minimal amount of tokens, so in case of hack nothing bad happens. There is no incentive for attacks, tokens are not held in contract. It is a plus and best for the community.*

MPC - Merkle Proof Centralization

Criticality	Minor / Informative
Location	contracts/V8AirdropClaim.sol#L222,270
Status	Acknowledged

Description

The contract uses a Merkle Proof mechanism in order to define many applicable addresses. The verification process is based on an off-chain configuration. The contract owner is responsible for updating the in-chain “Merkle Root” in order to validate correctly the provided message.

```
function setRoot(bytes32 root_) external
onlyRole(DEFAULT_ADMIN_ROLE) {
    if (root_ == 0x0) {
        revert ZeroRoot();
    }
    root = root_;
    emit SetRoot(root_);
}

function isProofValid(address owner, bytes32[] memory proof)
public view returns(bool) {
    bytes32 leaf =
keccak256(bytes.concat(keccak256(abi.encode(owner,
CHAIN_ID))));
    //...
}
```

Recommendation

We state that the Merkle Proof algorithm is required for proper protocol operations and gas consumption decrease. Thus, we emphasize that the Merkle proof algorithm is based on an off-chain mechanism. Any off-chain mechanism could potentially be compromised and affect the on-chain state unexpectedly. The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions.

Temporary Solutions:

These measurements do not decrease the severity of the finding

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-signature wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

Permanent Solution:

- Renouncing the ownership, which will eliminate the threats but it is non-reversible.

Team Update

The team has acknowledged that this is not a security issue and states: *Merkel tree is by design a very centralized solution, a lot of projects use it. It's efficient for cost effectiveness for project and airdrop participants.*

CCR - Contract Centralization Risk

Criticality	Minor / Informative
Location	contracts/V8AirdropClaim.sol#L189,204,222,251
Status	Acknowledged

Description

The contract's functionality and behavior are heavily dependent on external parameters or configurations. While external configuration can offer flexibility, it also poses several centralization risks that warrant attention. Centralization risks arising from the dependence on external configuration include Single Point of Control, Vulnerability to Attacks, Operational Delays, Trust Dependencies, and Decentralization Erosion.

```
function openAirdropSessionNow(uint256
sessionDurationInMinutes) external
onlyRole(AIRDROP_SESSION_OPENER_ROLE) {/*...*/}


function openAirdropSessionAt(
    uint256 startYear,
    uint256 startMonth,
    uint256 startDay,
    uint256 startHours,
    uint256 startMinutes,
    uint256 sessionDurationInMinutes
) external onlyRole(AIRDROP_SESSION_OPENER_ROLE) {/*...*/}

function setRoot(bytes32 root_) external
onlyRole(DEFAULT_ADMIN_ROLE) {/*...*/}

function updateClaimFeeAmount(uint256 claimFeeAmount_) external
onlyRole(DEFAULT_ADMIN_ROLE) {/*...*/}
```

Recommendation

To address this finding and mitigate centralization risks, it is recommended to evaluate the feasibility of migrating critical configurations and functionality into the contract's codebase itself. This approach would reduce external dependencies and enhance the contract's self-sufficiency. It is essential to carefully weigh the trade-offs between external configuration flexibility and the risks associated with centralization.

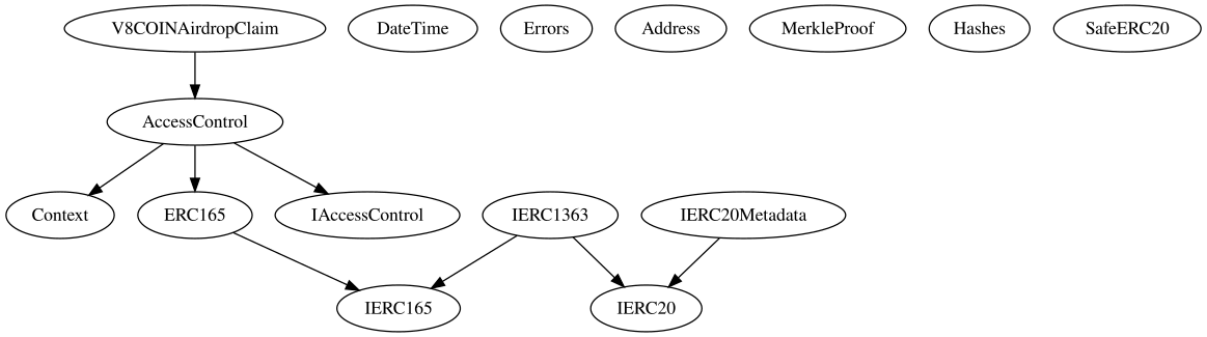
Team Update

The team has acknowledged that this is not a security issue and states: *We opted for cold storage hardware wallets. Multisignature is not necessarily a guarantee of decentralization. It just means different signatures permissions.Project has not been launched so it is normal to see huge wallets during distribution and before project launch.*

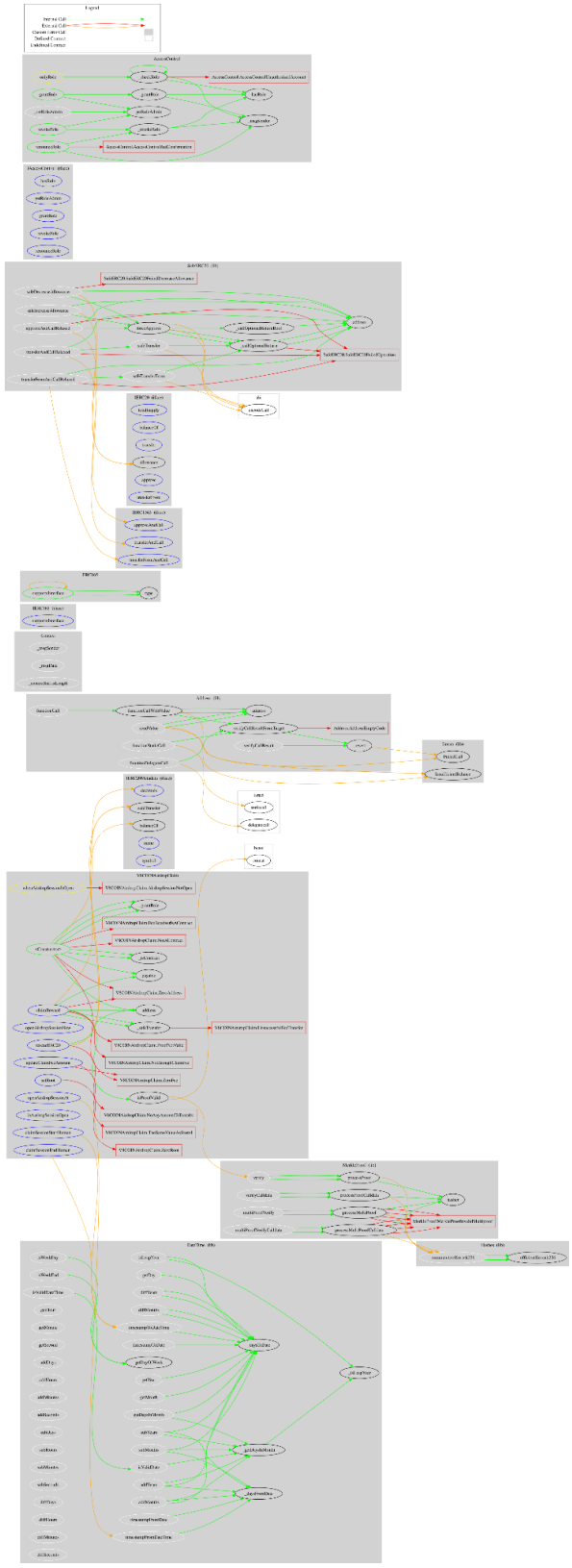
Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
V8COINAirdrop Claim	Implementation	AccessControl		
		Public	✓	-
	claimReward	External	Payable	whenAirdropSessionIsOpen
	openAirdropSessionNow	External	✓	onlyRole
	openAirdropSessionAt	External	✓	onlyRole
	setRoot	External	✓	onlyRole
	rescueERC20	External	✓	onlyRole
	updateClaimFeeAmount	External	✓	onlyRole
	isProofValid	Public		-
	isAirdropSessionOpen	External		-
	claimSessionStartHuman	External		-
	claimSessionEndHuman	External		-
	_safeTransfer	Internal	✓	
	_isContract	Internal		

Inheritance Graph



Flow Graph



Summary

The V8COINAirdropClaim contract implements a secure and efficient mechanism for managing token airdrop claims, incorporating features such as Merkle proof validation, role-based access control, and session-based claim management. This audit investigates potential security vulnerabilities, evaluates the correctness of business logic, and identifies areas for improvement to enhance the contract’s robustness and functionality.

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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.

The Cyberscope team

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