PROOF

CLIFFORD INU
SMART CONTRACT
SECURITY AUDIT REPORT

Disclaimer

This is a limited report of findings based on an analysis of industry best practices as of the date of this report regarding cybersecurity vulnerabilities and issues in smart contract frameworks and algorithms, the details of which are detailed in this report. stated in the report. To get the full picture of our analysis, it's important to read the full report. Although we have conducted our analysis and have done our best to prepare this report, you should not rely on this report and cannot claim against us based on what it does or does not say or how it was produced. It is important to do your own research before making any decisions. This is explained in more detail in the following disclaimer. Please be sure to read to the end.

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Security analytics are based solely on smart contracts. Application or process security not checked. Product code not reviewed.

Table of Contents

Executive Summary

Objectives

Proof Audit was tasked with auditing Clifford INU, specifically their ERC20 token. The project is based on the Ethereum Network. The team provided documentation which helped with understanding the functions of their code. Our findings in the audit ranged from

Project Info

Audited project

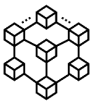
Clifford Inu

Contacts

N/A

Deployer Address

0x81ed317154E4C6E829B0358F59C5578719E95ccB



Blockchain

Ethereum

Project website:

https://cliffordinu.io/

Methodology

During the audit process, we inspected the repository thoroughly, using a line-by-line code read through to review vulnerabilities, quality of the code and adherence to best practices and specifications. We used Computer-Aided Verification to support the audit process.

Our auditing process is as follows:

1. Code Review:
   A review of the scope, specifications and documentation provided to ensure an in depth understanding of the purpose and functionality of the relevant smart contracts.
2. Automated Analysis:
   A series of reviews carried out with the use of automated tools. These reviews serve as a basis for further manual analysis and provide relevant visualizations of the code.
3. Testing & Manual Review of Code:
   Test coverage analysis and a line-by-line read through of the project code in order to identify vulnerabilities, errors and weaknesses in code quality.
4. Specification Comparison:
   A review of the code against the specifications provided to ensure that the code operates as is intended.
5. Best Practices Review:
   A review of the smart contracts to identify potential improvements in effectiveness, efficiency and maintainability, with a focus on adherence to industry best practices.

Scope

The contracts audited are from the CliffordInu/CLIFF git repository. The audit is based on the commit 'Create cliff.sol' from Dec/15/2022.

The audited contracts are:

cliff.sol

The scope of the audit is limited to this file. No other files in this repository were audited. Its dependencies are assumed to work according to their documentation. Also, no tests were reviewed for this audit.

cliff.sol Inheritance Graph

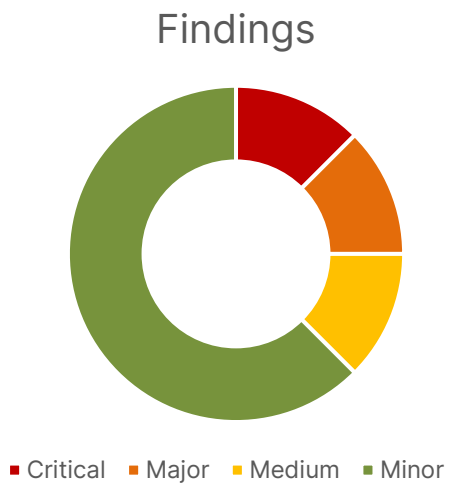
Analyses

Without being limited to them, the audit process included the following analyses:

- Arithmetic errors
- Outdated version of Solidity compiler
- Race conditions
- Reentrancy attacks
- Misuse of block timestamps
- Denial of service attacks
- Excessive gas usage
- Missing or misused function qualifiers
- Needlessly complex code and contract interactions
- Poor or nonexistent error handling
- Insufficient validation of the input parameters
- Incorrect handling of cryptographic signatures
- Centralization and upgradeability

Summary of Findings

We found **1** critical issue, **1** Major issues, **1** medium issues and **5** minor issues.



Security Issues

ID	Title	Severity	Status
CWE-1076	Burn LP Tokens Without Holders Approval	Critical	**Acknowledged**
CWE-1076	Minting to Centralized Address	Major	**Acknowledged**
N/A	Mistakenly Calculating Fees	Medium	**Acknowledged**
N/A	Third Party Dependencies	Minor	**Acknowledged**
CWE-710	Potential Sandwich Attacks	Minor	**Acknowledged**
CWE-710	Missing Input Validation	Minor	**Acknowledged**
N/A	Mistakenly Calculating Max Wallet	Minor	**Acknowledged**
SWC-115	Use of "tx.origin" as a part of authorization control	Minor	**Acknowledged**

Findings

Severity Classification

Security risks are classified as follows:

- **Critical:** These are issues that we manage to exploit. They compromise the system seriously. They must be fixed **immediately**.
- **Medium:** These are potentially exploitable issues. Even though we did not manage to exploit them, or their impact is not clear, they might represent a security risk in the near future. We suggest fixing them **as soon as possible**.
- **Minor:** These issues represent problems that are relatively small or difficult to take advantage of but can be exploited in combination with other issues. These kinds of issues do not block deployments in production environments. They should be taken into account and be fixed **when possible**.

Issues Status

An issue detected by this audit can have four distinct statuses:

- **Unresolved**: The issue has not been resolved.
- **Acknowledged**: The issue remains in the code but is a result of an intentional decision.
- **Resolved**: Adjusted program implementation to eliminate the risk.
- **Partially resolved**: Adjusted program implementation to eliminate part of the risk. The other part remains in the code but is a result of an intentional decision.
- **Mitigated**: Implemented actions to minimize the impact or likelihood of the risk.

Critical Severity Issues

Burn LP Tokens Without Holders Approval

Status: **Acknowledged**

Major Severity Issues

Minting To Centralized Address

Description: The full amount of totalSupply tokens are initially minted to the msg.sender address belonging to the contract owner.

Recommendation: The private key's of the owner accounts should be carefully protected to avoid potential risks of hacking.

Status: **Acknowledged**

Medium Severity Issues

Mistakenly Calculating Fees

Status: **Acknowledged**

Minor Severity Issues

Third Party Dependencies

Description: The contract interacts with the Uniswap third party protocol. Third party protocols are not covered in the scope of the audit. There is a potential for third party protocols to be compromised.

Recommendation: Interaction with third party dependencies is necessary for the CliffordInu functionality, therefore we recommend that the team does their due diligence to ensure the protocols they are interacting with are secure and remain secure.

Status: **Acknowledged**

Potential Sandwich Attacks

Description: Sandwich attacks occur when an attacker places an order directly before a victim transaction and also places one directly after it. In essence, the attacker will front-run and back-run simultaneously, with the original pending transaction sandwiched in between.

The `swapTokensForEth()` and `addLiquidity()` functions are called with no restriction on minimum output amount or slippage, making them vulnerable to sandwich attacks.

Recommendation: We recommend setting minimum output amounts greater than 0 for the relevant functions.

Status: **Acknowledged**

Missing Input Validation

Description: The `updateMarketingWallet` and `updateDevWallet` functions have no mechanism in place to check that they are not being assigned to a non-zero address.

Recommendation: We recommend including a check for a non-zero wallet for the values passed in these functions.

Status: **Acknowledged**

Mistakenly Calculating Max Wallet

Description: Following a transfer, the `amount` that is calculated as a wallets token balance includes fees. Without fees included then the token balance of the wallet may not actually be greater than the max wallet amount.

Recommendation: We recommend subtracting fees from the calculation of the receiver wallets token balance.

Status: **Acknowledged**

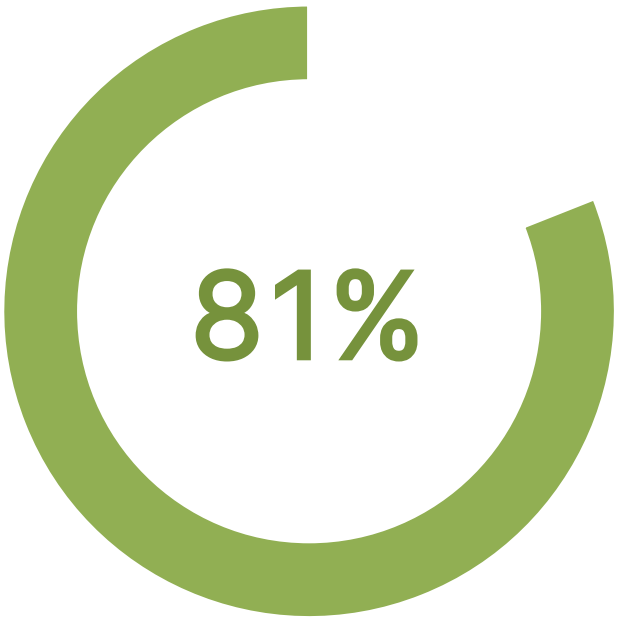
Use of "tx.origin" as a part of authorization control

Description: Using "tx.origin" as a security control can lead to authorization bypass vulnerabilities.

Recommendation: We recommend the client considers using "msg.sender" instead unless the use of “tx.origin” is absolutely necessary.

Status: **Acknowledged**

Security Rating



Based on Vulnerabilities Found

Changelog

- 25-11-2022 – Initial report based on commit '[Create cliff.sol]' from Dec/15/2022.