



Security Assessment

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Disclaimer

About

Summary

This report has been prepared for CRYPTEQ to discover issues and vulnerabilities in the source code of the CRYPTEQ - Core DAO project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Static Analysis and Manual Review techniques. The auditing process pays special attention to the following considerations:

Testing the smart contracts against both common and uncommon attack vectors. Assessing the codebase to ensure compliance with current best practices and industry standards. Ensuring contract logic meets the specifications and intentions of the client.

Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders. Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

Enhance general coding practices for better structures of source codes; Add enough unit tests to cover the possible use cases; Provide more comments per each function for readability, especially contracts that are verified in public; Provide more transparency on privileged activities once the protocols live.

Project Summary

Project Name	CRYPTTEQ - (https://crypteq.finance)
Platform	CORE DAO
Language	Solidity
Codebase	https://scan.coredao.org/token/0x03faab80a25fe8cfef964273f9a80716e79c3a91
Commit	633197cbb6146108505780633675f29b1461086657806337ce164714610886

Audit Summary

Delivery Date	F e b , 2 6 2 0 2 3
Audit Methodology	Static Analysis, Manual Review
Key Components	CoinToken

Vulnerability Summary

ID	Title	Category	Severity	Status
CKP-01	Centralization Related Risks	Centralization / Privilege	Major	● Acknowledged
HEC-01	Lack Of Storage Gap In Upgradeable Contract	Volatile Code	Minor	● Resolved
HRK-01	Missing Pool Authority Check In RFQt Cross Chain Trading	Logical Issue	Minor	● Resolved
HXU-01	Third Party Dependency	Volatile Code	Minor	● Acknowledged
CKP-02	Typos In Comments And Error Messages	Coding Style	Informational	● Resolved
HRK-02	Inconsistency Between Comment And Code	Inconsistency	Informational	● Resolved
HXU-02	Missing Nonce Check For <code>liReceive()</code>	Volatile Code	Informational	● Acknowledged

SWARM SOURCE

ID	File	SHA256 Checksum
CKP	contract.sol	4a310b76e5b119338e078bbc68d5f5819db9e5e7cd31685bca1c89084502f100

Overview

External Dependencies

The contract serves as the underlying entity to interact with third-party protocols (token-wrapping). The scope of the audit treats third-party entities as blackboxes and assumes their functional correctness. However, in the real world, third parties can be compromised and this may lead to lost or stolen assets.

Privileged Functions

The contract contains the following privileged functions that are restricted by role with the modifier. They are used to modify the contract configurations and address attributes. We grouped these functions below.

- `setAutoRebase()`
- `excludeFromFee() / includeInFee()`
- `setAutoAddLiquidity`
- `setBlacklistAddress()`
- `setInsuranceFundFee()`
- `setInsuranceFundReceiver()`
- `setIncreaseAllowance`
- `setRenounceOwnership()`
- `setSetAutoAddLiquidity(bool _flag)`
- `setBotBlacklist()`
- `setTransferOwnership(address newOwner)`
- `setMaxWalletAccount()`
- `setSwapAndLiquifyEnabled()`
- `setRouterAddress()`
- `setNumTokensSellToAddToLiquidity()`

To improve the trustworthiness of the project, dynamic runtime updates in the project should be notified to the community. Any plan to invoke the aforementioned functions should be also considered to move to the execution queue of the Timelock contract.

01 | Centralization Risk in Function

Description

The `addLiquidity()_hasLiqBeenAdded()` function calls the `coreDAOV2Router.addLiquiditycore` function with the `to()` address specified as `owner()` for acquiring the generated LP tokens from the corresponding pool. As a result, over time the `_owner` address will accumulate a significant portion of LP tokens. If `_owner` is an EOA (Externally Owned Account), mishandling of its private key can have devastating consequences to the project as a whole.

Recommendation

We advise `to()` the address of the `coreDAOV2Router.addLiquiditycore()` function call to be replaced by the `contract()` itself, i.e. `address(this)`, and to restrict the management of the LP tokens within the scope of the contract's business logic. This will also protect the LP tokens from being stolen if the `_owner()` account is compromised. In general, we strongly recommend centralized privileges or roles in the protocol to be improved via a decentralized mechanism or via smart-contract based accounts with enhanced security practices, f.e. `Multisignature wallets()`.

Indicatively, here are some feasible solutions that would also mitigate the potential risk:

- Time-lock with reasonable latency, i.e. 48 hours, for awareness on privileged operations;
- Assignment of privileged roles to multi-signature wallets to prevent single point of failure due to the private key;
- Introduction of a DAO / governance / voting module to increase transparency and user involvement

02 | Centralization Risk in Contract

Category	Severity	Location	Status
Centralization / Privilege	● Major	projects/contract.sol (98ba012): 603, 640, 644, 648, 652, 656, 660, 665, 906, 912, 612, 636	① Acknowledged

Description

In the contract `CoinTokens()`, the role `_owner()` has the authority over the following function:

- `excludeFromReward()` / `includeInReward()` ; the owner of the contract can exclude/include an account from/in rewards.
- `excludeFromFee()` / `includeInFee()` : the owner of the contract can exclude/include an account from/in fee.
- `setTaxFeePercent()` : the owner of the contract can set the percentage of the tax fee.
- `setDevFeePercent()` : the owner of the contract can set the percentage of the dev fee.
- `setLiquidityFeePercent()` : the owner of the contract can set the percentage of liquidity fee.
- `setMaxTxPercent()` : the owner of the contract can set the maximum transaction amount.
- `setDevWalletAddress()` : the owner of the contract can update the arbitrary address.
- `setRouterAddress()` : the owner of the contract can set any arbitrary address as the router address.
- `setNumTokensSellToAddToLiquidity()` : the owner of the contract can set the threshold to trigger liquidity-adding process.

Any compromise to the `_owner()` account may allow the hacker to take advantage of this and modify the significant state of the contract, thus introducing centralization risk.

03 | Contract Gains Non-withdrawable CORE via the owner Function

Description

The `swapAndLiquify()` function converts half of the `contractTokenBalance()` tokens to CORE. The other half of the tokens and part of the converted CORE are deposited into the corresponding pool on pancakeswap as liquidity. For every `swap&liquify()` function call, a small amount of CORE is leftover in the contract. This is due to the price of drops after swapping the first half of tokens into COREs, and the other half of tokens require less than the converted CORE to be paired with it when adding liquidity. The contract doesn't appear to provide a way to withdraw those CORE, and they will be locked in the contract forever.

Recommendation

It's not ideal that more and more CORE are locked into the contract over time. The simplest solution is to add a `withdraw()` function in the contract to withdraw CORE. Other approaches that benefit the token holders can be:

- Distribute CORE to token holders proportional to the amount of token they hold.
- Use leftover CORE to buy back tokens from the market to increase the token price.

04 | Regaining Ownership After Renouncing the Contract Ownership

Description

Generally, renouncing the ownership should leave the contract without an owner, thereby removing any functionality that is only available owner to the owner. However, the owner of the cointoken is possible to gain ownership of the contract again even if the owner has called the function `renounceOwnership()` is possible to gain to `renounce()` the ownership. This can be achieved by performing the following operations:

- Call `lock()` Call to lock the contract. The variable `_previousowner()` to unlock the contract.
- Call `unlock()` to unlock the contract
- would be set to the current owner.
- Call `renounce()` to renounce the contract ownership. to regain ownership.
- Call `unlock()` to gain the ownership

Recommendation

We advise the client to review the logic and ensure if it is the intended design. If timelock functionality should be introduced, we recommend using the implementation of Compound finance as reference.

05 | Initial Token Distribution

Category	Severity	Location	Status
Logical Issue	● Minor	projects/contract.sol (98ba012): 497	📄 Acknowledged

Description

All of the tokens are sent to the contract deployer when deploying the contract. This could be a centralization risk as the deployer can distribute those tokens without obtaining the consensus of the community.

Recommendation

We recommend the team to be transparent regarding the initial token distribution process.

06 | Lack of Return Value Handling

Category	Severity	Location	Status
Volatile Code	● Minor	projects/contract.sol (98ba012): 843	ⓘ Acknowledged

Description

The return values of function `uniswapRouter()` are properly handled.

```
interface IUniswapRouter{
    function factory() external pure returns (address);
    function WETH() external pure returns (address);

    function addLiquidity(
        address tokenA,
        address tokenB,
        uint amountADesired,
        uint amountBDesired,
        uint amountAMin,
        uint amountBMin,
        address to,
        uint deadline
    ) external returns (uint amountA, uint amountB, uint liquidity);
    function addLiquidityETH(
        address token,
        uint amountTokenDesired,
        uint amountTokenMin,
        uint amountETHMin,
        address to,
        uint deadline
```

Recommendation

We recommend using variables to receive the return value of the functions mentioned above and handle both success and failure cases if needed by the business logic.

07 | Potential Sandwich Attacks

Category	Severity	Location	Status
Logical Issue	● Minor	projects/contract.sol (98ba012): 832~838, 843~850	📄 Acknowledged

Description

A sandwich attack might happen when an attacker observes a transaction swapping tokens or adding liquidity without setting restrictions on slippage or minimum output amount. The attacker can manipulate the exchange rate by frontrunning (before the transaction being attacked) a transaction to purchase one of the assets and make profits by backrunning (after the transaction being attacked) a transaction to sell the asset.

The following functions are called without setting restrictions on slippage or minimum output amount, so transactions triggering these functions are vulnerable to sandwich attacks, especially when the input amount is large:

Recommendation

We recommend setting reasonable minimum output amounts, instead of 0, based on token prices when calling the aforementioned functions.

08 | Lack of Error Message

Description

The require statement can be used to check for conditions and throw an exception if the condition is not met. It is better to provide a string message containing details about the error that will be passed back to the caller.

Recommendation

We advise refactoring the linked codes as below:

```
560         _approve(_msgSender(), spender, _allowances[_msgSender()])
[spender].add(addedValue, "increase allowance overflow");
```

09 | Redundant Code

Category	Severity	Location	Status
Logical Issue	● Informational	projects/contract.sol (98ba012): 862	① Acknowledged

Description

The condition! _isExcluded[sender] & !_isExcluded[recipient] can be included in else .

Recommendation

The following code can be removed:

```
abstract contract ERC20Detailed is IERC20 {
    string private _name;
    string private _symbol;
    uint8 private _decimals;

    constructor(
        string memory name_,
        string memory symbol_,
        uint8 decimals_
    ) {
        _name = name_;
        _symbol = symbol_;
        _decimals = decimals_;
    }
}
```

10 | Typos In The Contract

Description

There are several typos in the code and comments.

```
uint256 public constant DECIMALS = 5;
uint256 public constant MAX_UINT256 = ~uint256(0);
uint8 public constant RATE_DECIMALS = 7;

uint256 private constant INITIAL_FRAGMENTS_SUPPLY = 700 * 10**3 * 10**DECIMALS;

uint256 public liquidityFee = 400;
uint256 public treasuryFee = 250;
uint256 public insuranceFundFee = 500;
uint256 public sellFee = 200;
uint256 public firePitFee = 250;
uint256 public totalFee =
    liquidityFee.add(treasuryFee).add(insuranceFundFee).add(
        firePitFee
    );
uint256 public feeDenominator = 10000;

address DEAD = 0x00000000000000000000000000000000dEaD;
address ZERO = 0x000000000000000000000000000000000000;
```

Recommendation

We recommend correcting all typos in the contract.

11 | Function and Variable Naming Doesn't Match the Operating Environment

Category	Severity	Location	Status
Coding Style	● Informational	projects/contract.sol (98ba012): 1	① Acknowledged

Description

There are multiplenames inside the current contract, which can be misleading to use `coreDAO()` and `core()` instead of `pancakeswap()` and `CORE()` if the project landing on Core DAO.

For example, the `cointoken()` contract uses `pancakeswap()` for swapping and adding liquidity to the Pancakeswap pool but names it `coreDAO()`

Recommendation

Change "coreDAO" and "core" to "Pancakeswap" and "CORE" in the contract respectively to match the operating environment and avoid confusion.

12 | Potential Resource Exhaustion

Category	Severity	Location	Status
Logical Issue	● Informational	projects/contract.sol (98ba012): 614, 709	① Acknowledged

Description

The `farloop()` within functions `includeInReward(address)` and `_getCurrentSupply()` takes the variable `_excluded.length()`, as the maximal iteration times. If the size of the array is very large, it could exceed the gas limit to execute the functions. In this case, the contract might suffer from DoS (Denial of Service) situation.

Recommendation

We recommend the team review the design and ensure this would not cause loss to the project.

13 | Inconsistency Between Comment and Code

Category	Severity	Location	Status
Inconsistency	● Informational	projects/contract.sol (98ba012): 230~236	📄 Acknowledged

Description

According to the comment in L238, the `lock()` function will lock the contract for a given time period. However, the code implementation will lock the contract until the given timestamp.

```
238 //Unlocks the contract for owner when _lockTime is exceeds
239 function unlock() public virtual {
240     require(_previousOwner == msg.sender, "You don't have permission to
unlock.");
241     require(block.timestamp > _lockTime, "Contract is locked.");
242     emit OwnershipTransferred(_owner, _previousOwner);
243     _owner = _previousOwner;
244 }
```

Recommendation

We recommend the team review the design and update either comments or code implementation to ensure consistent logic between code and comment.

Appendix

Finding Categories

Centralization / Privilege

Centralization / Privilege findings refer to either feature logic or implementation of components that act against the nature of decentralization, such as explicit ownership or specialized access roles in combination with a mechanism to relocate funds.

Logical Issue

Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Coding Style

Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

Inconsistency

Inconsistency findings refer to functions that should seemingly behave similarly yet contain different code, such as a constructor assignment imposing different requirements on the input variables than a setter function.

Checksum Calculation Mismatch

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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