CheckPoint

Token Security Audit Report
Prepared for Antano

[v.1.0]

September 2021

Document Properties

Client	Antano
Platform	Binance Smart Chain
Language	Solidity
Codebase	0xc1940EcC8e257949825C324C74aa91EeA39DdC18

Audit Summary

Delivery Date	04.09.2021
Audit Methodology	Static Analysis, Manual Review
Auditor(s)	Erno Patiala
Classification	Publlic
Version	1.0

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Remark: For more information about this document and its contents, please contact CheckPoint team

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1 Executive Summary

On 04/09/2021, CheckPoint conducted a full audit for the Antano to verify the overall security posture including a smart contract review to discover issues and vulnerabilities in the source code. Static Code Analysis, Dynamic Analysis, and Manual Review werdone in conjunction to identify smart contract vulnerabilities together with technical & business logic flaws that may be exposed to the potential risk of the platform and the ecosystem.

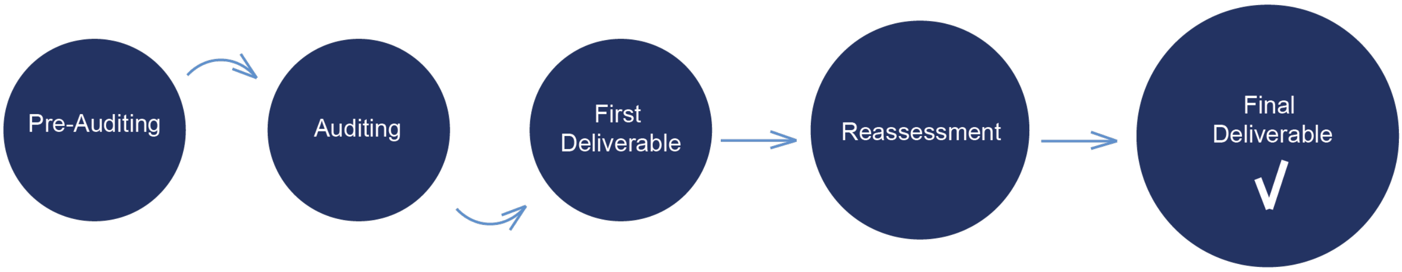
After further analysis and internal discussion, we determined a few issues of varying severities that need to be brought up and paid more attention to. More information can be found in **Section 5 'Audit Result'**. Practical recommendations are provided according to each vulnerability found and should be followed to remediate the issue.

🟥 **Antano**
High Risk Level

Communication Channels	Website Content Analysis, Social Media Listening
Smart Contract Code	Smart Contract Details, Contract Function Details, Issues Checking Status, Detailed Findings Information

THIS TOKEN PASSES CHECKPOINT'S SECURITY VERIFICATION STANDART

2 Audit Methodology



CheckPoint conducts the following procedure to enhance the security level of our clients' tokens:

- **Pre-Auditing**

  Planning a comprehensive survey of the token, its ecosystem, possible risks & prospects, getting to understand the overall operations of the related smart contracts, checking for readiness, and preparing for the auditing.

- **Auditing**

  Study of all available information about the token on the Web, inspecting the smart contracts using automated analysis tools and manual analysis by a team of professionals.

- **First Deliverable and Consulting**

  Delivering a preliminary report on the findings with suggestions on how to remediate those issues and providing consultation.

- **Reassessment**

  Verifying the status of the issues and whether there are any other complications in the fixes applied.

- **Final Deliverable**

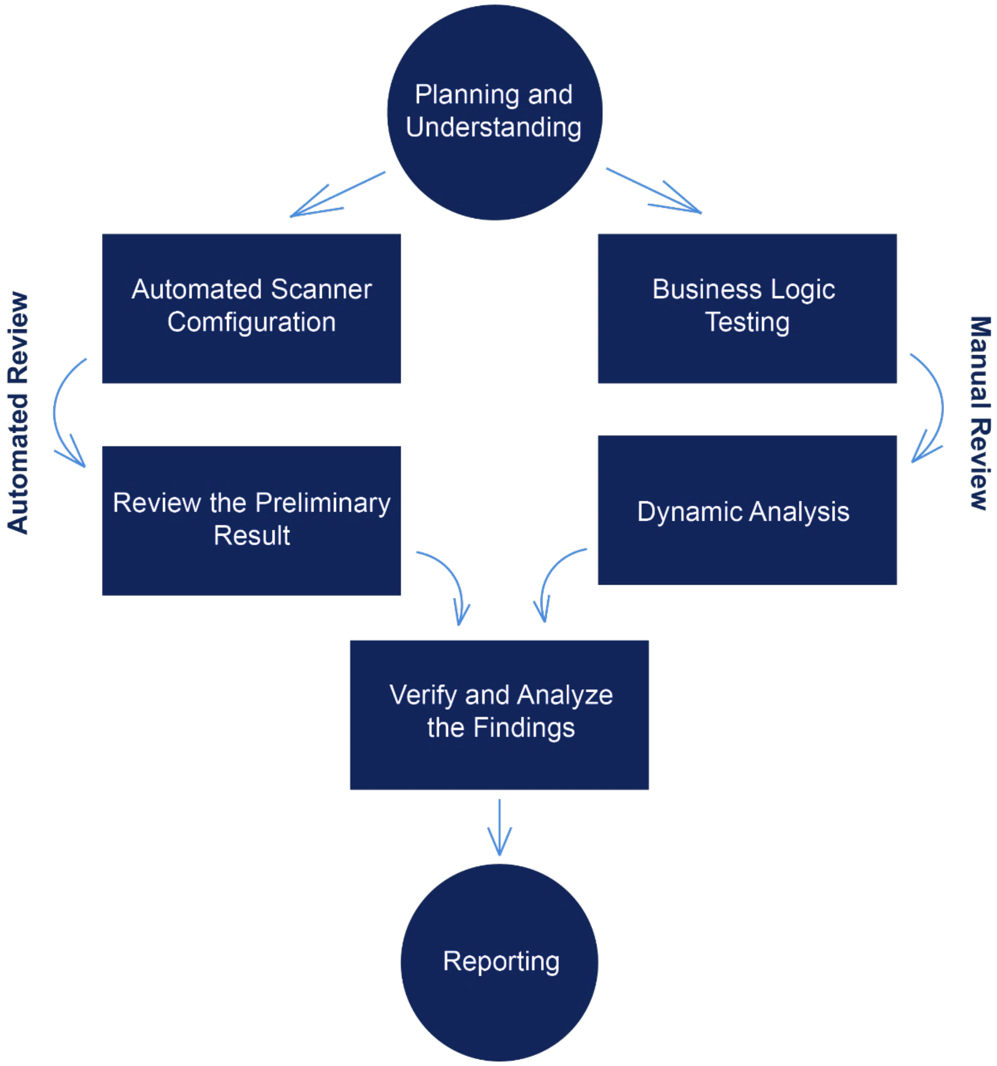
  Providing a full report with the detailed status of each issue.

The security audit process of CheckPoint includes three types testing:

1. Examining publicly available information about the token on social networks, including a detailed overview of the official website and analysis of the latest messages and opinions about the token.

2. Smart contract codes are scanned/tested for commonly known and more specific vulnerabilities using automated analysis tools.

3. Manual audit of the codes for security issues. The contracts are manually analyzed to look for any potential problems.


Planning and Understanding
Automated Scanner Comfiguration
Business Logic Testing
Automated Review
Manual Review
Review the Preliminary Result
Dynamic Analysis
Verify and Analyze the Findings
Reporting

Remark: Manual and Automated review approaches can be mixed and matched including business logic analysis in terms of malicious doers' perspective

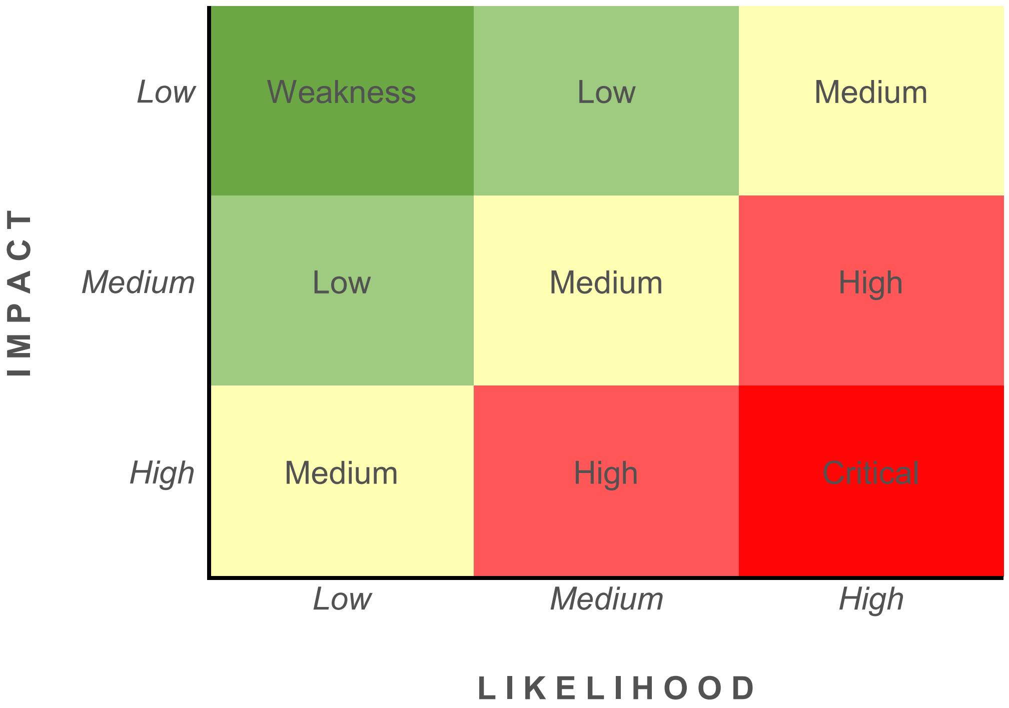
In particular, we perform the audit according to the following procedure:

- **Planning & Understanding**
  - determine scope of testing and understand application purpose and workflows;
  - identify key risk areas, including technical and business risks;
  - determine approach – which sections to review within the resource constraints and review method – automated, manual or mixed.
- **Automated Review**
  - adjust automated source code review tools to inspect the code for known unsafe coding patterns;
  - verify output of the tool in order to eliminate false positive result, and if necessary, adjust and re-run the code review tool.
- **Manual Review**
  - testing for business logic flaws requires thinking in unconventional methods;
  - identify unsafe coding behavior via static code analysis.
- **Reporting**
  - analyze the root cause of the flaws;
  - recommend coding process improvements.

3 Risk Level Classification

To standardize the evaluation, we define the following terminology based on OWASP Risk Rating Methodology:

- **Likelihood** represents how likely a particular vulnerability is to be uncovered and exploited in the wild.
- **Impact** measures the technical loss and business damage of a successful attack.
- **Severity** demonstrates the overall criticality of the risk and calculated as the product of impact and likelihood values, illustrated in a twodimensional matrix. The shading of the matrix visualizes the different risk levels.



IMPACT			
Low	Weakness	Low	Medium
Medium	Low	Medium	High
High	Medium	High	Critical
	Low	Medium	High
	LIKELIHOOD		

Remark: Likelihood and Impact are categorized into three levels: H, M, and L, i.e., High, Medium and Low respectively. Severity is determined by likelihood and impact and can be classified into five categories accordingly, i.e., Critical, High, Medium, Low and Weakness

For prioritization of the vulnerabilities, we have adopted the scheme by five distinct levels for risk: Critical, High, Medium, Low, and Weakness. The risk level definitions are presented in table.

LEVEL	DESCRIPTION
Weakness	There are safety risks theoretically, but it is extremely difficult to reproduce in engineering
Low	Low severity vulnerabilities may affect the operation of the DeFi project in certain scenarios
Medium	Medium severity vulnerability will affect the operation of the DeFi project. It is recommended to fix medium-risk vulnerabilities
High	High severity vulnerabilities will affect the normal operation of the DeFi project. It is strongly recommended to fix high-risk vulnerabilities
Critical	Critical severity vulnerabilities will have a significant impact on the security of the DeFi project

4 Project Overview

4.1 Communication Channels

✓ **No Website [RISK]**

✓ **> 1000 Telegram Members**

✓ **4 Twitter Followers [RISK]**

✓ **No Active Voice Chats [RISK]**

✓ **No Injected Spam Found**

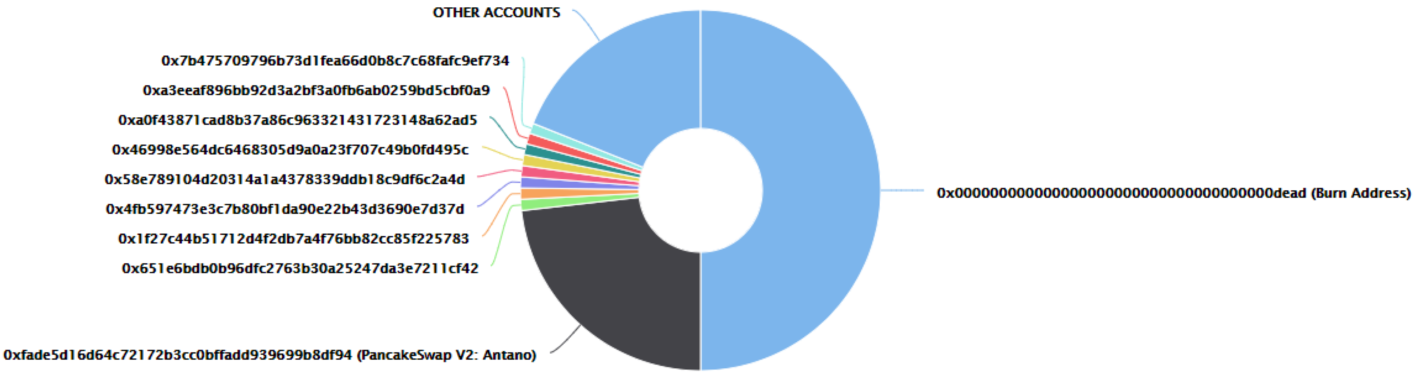
✓ **No Popus Found**

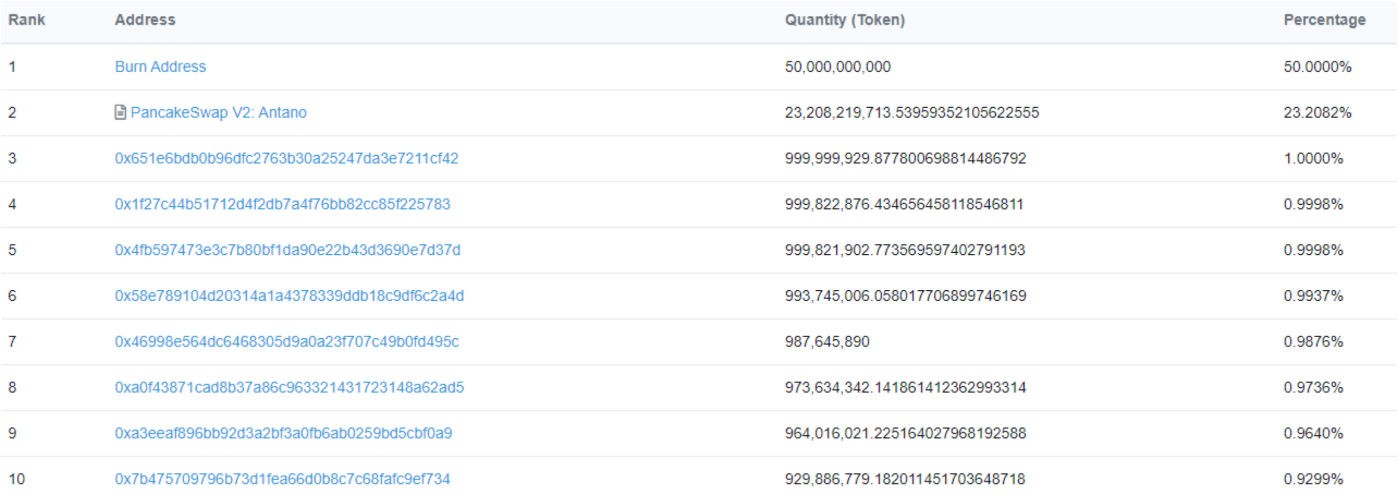
Remark: This page contains active links

4.2 Smart Contract Details

Contract Name	Antano
Contract Address	0x70e8e3bc1ef8c5b9fe297c63b297612d51e575d1
Total Supply	100,000,000,000
Token Ticker	Antano
Decimals	18
Token Holders	59
Transactions Count	363
Top 10 Holders Dominance	81,06%
ADARewards Fee	11%
Liquidity Fee	5%
Marketing Fee	4%
Uniswap V2 Pair	0xfade5d16d64c72172b3cc0bffadd939699b8df94
Contract Deployer Address	0xfc745837af53701f3e7cafb0de3af9d11c2aeb5b
Current Owner Address	0xfc745837af53701f3e7cafb0de3af9d11c2aeb5b

Antano Top 10 Token Holders

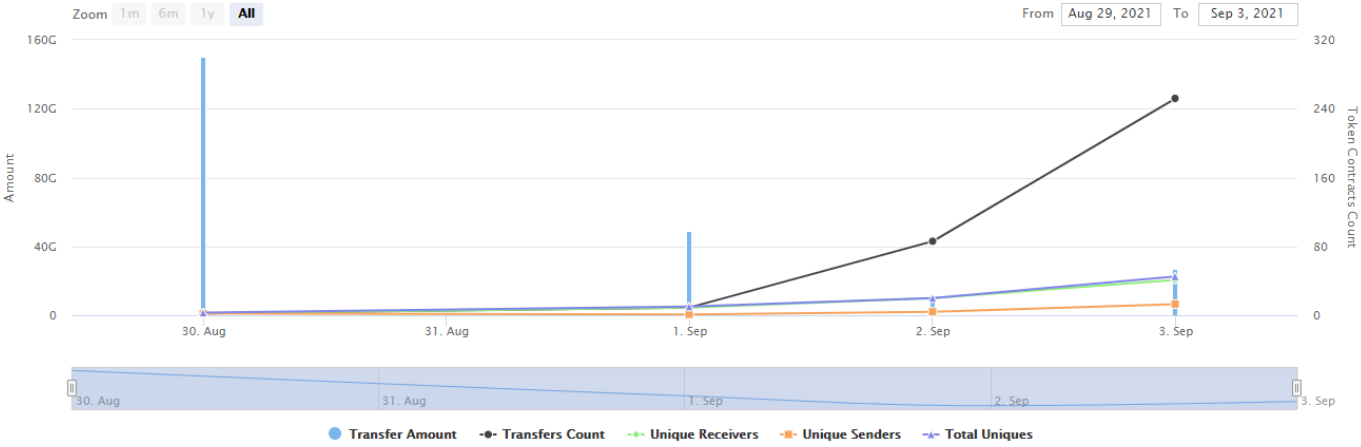




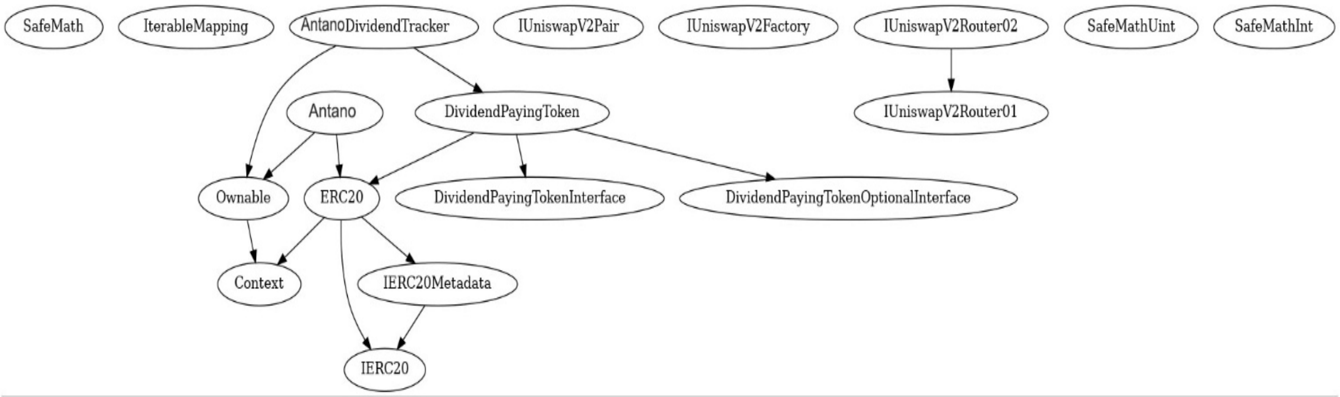
Rank	Address	Quantity (Token)	Percentage
1	Burn Address	50,000,000,000	50.0000%
2	PancakeSwap V2: Antano	23,208,219,713.53959352105622555	23.2082%
3	0x651e6bdb0b96dfc2763b30a25247da3e7211cf42	999,999,929.877800698814486792	1.0000%
4	0x1f27c44b51712d4f2db7a4f76bb82cc85f225783	999,822,876.434656458118546811	0.9998%
5	0x4fb597473e3c7b80bf1da90e22b43d3690e7d37d	999,821,902.773569597402791193	0.9998%
6	0x58e789104d20314a1a4378339ddb18c9df6c2a4d	993,745,006.058017706899746169	0.9937%
7	0x46998e564dc6468305d9a0a23f707c49b0fd495c	987,645,890	0.9876%
8	0xa0f43871cad8b37a86c963321431723148a62ad5	973,634,342.141861412362993314	0.9736%
9	0xa3eeaf896bb92d3a2bf3a0fb6ab0259bd5cbf0a9	964,016,021.225164027968192588	0.9640%
10	0x7b475709796b73d1fea66d0b8c7c68fafc9ef734	929,886,779.182011451703648718	0.9299%

✓ **50% tokens are permanently removed from circulation**

Antano Contract Interaction Details



4.3 Contract Function Details



```
$ = payable function
# = non-constant function
[Int] = Internal
[Pub] = Public
[Prv] = Private
[Ext] = External

+ [Int] IUniswapV2Router01
   - [Ext] factory
   - [Ext] WETH
   - [Ext] addLiquidity #
   - [Ext] addLiquidityETH $
   - [Ext] removeLiquidity #
   - [Ext] removeLiquidityETH #
   - [Ext] removeLiquidityWithPermit #
   - [Ext] removeLiquidityETHWithPermit #
   - [Ext] swapExactTokensForTokens #
   - [Ext] swapTokensForExactTokens #
   - [Ext] swapExactETHForTokens $
   - [Ext] swapTokensForExactETH #
   - [Ext] swapExactTokensForETH #
   - [Ext] swapETHForExactTokens $
   - [Ext] quote
   - [Ext] getAmountOut
   - [Ext] getAmountIn
   - [Ext] getAmountsOut
   - [Ext] getAmountsIn

+ [Int] IUniswapV2Router02 (IUniswapV2Router01)
   - [Ext] removeLiquidityETHSupportingFeeOnTransferTokens #
   - [Ext] removeLiquidityETHWithPermitSupportingFeeOnTransferTokens #
```

```
  - [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
  - [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens $
  - [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

+ [Int] IUniswapV2Factory
  - [Ext] feeTo
  - [Ext] feeToSetter
  - [Ext] getPair
  - [Ext] allPairs
  - [Ext] allPairsLength
  - [Ext] createPair #
  - [Ext] setFeeTo #
  - [Ext] setFeeToSetter #

+ [Int] IUniswapV2Pair
  - [Ext] name
  - [Ext] symbol
  - [Ext] decimals
  - [Ext] totalSupply
  - [Ext] balanceOf
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transfer #
  - [Ext] transferFrom #
  - [Ext] DOMAIN_SEPARATOR
  - [Ext] PERMIT_TYPEHASH
  - [Ext] nonces
  - [Ext] permit #
  - [Ext] MINIMUM_LIQUIDITY
  - [Ext] factory
  - [Ext] token0
  - [Ext] token1
  - [Ext] getReserves
  - [Ext] price0CumulativeLast
  - [Ext] price1CumulativeLast
  - [Ext] kLast
  - [Ext] mint #
  - [Ext] burn #
  - [Ext] swap #
  - [Ext] skim #
  - [Ext] sync #
  - [Ext] initialize #

+ [Lib] IterableMapping
  - [Pub] get
  - [Pub] getIndexOfKey
  - [Pub] getKeyAtIndex
  - [Pub] size
  - [Pub] set #
  - [Pub] remove #
```

```
+ [Int] DividendPayingTokenOptionalInterface
  - [Ext] withdrawableDividendOf
  - [Ext] withdrawnDividendOf
  - [Ext] accumulativeDividendOf

+ [Int] DividendPayingTokenInterface
  - [Ext] dividendOf
  - [Ext] withdrawDividend #

+ [Lib] SafeMathInt
  - [Int] mul
  - [Int] div
  - [Int] sub
  - [Int] add
  - [Int] abs
  - [Int] toUnit256Safe

+ [Lib] SafeMathUint
  - [Int] toUnit256Safe

+ [Lib] SafeMath
  - [Int] add
  - [Int] sub
  - [Int] sub
  - [Int] mul
  - [Int] div
  - [Int] div
  - [Int] mod
  - [Int] mod

+ Context
  - [Int] _msgSender
  - [Int] _msgData

+ Ownable (Context)
  - [Pub] owner
  - [Pub] renounceOwnership #
    - modifiers: onlyOwner
  - [Pub] transferOwnership #
    - modifiers: onlyOwner

+ [Int] IERC20
  - [Ext] totalSupply
  - [Ext] balanceOf
  - [Ext] transfer #
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transferFrom #
```

```
+ [Int] IERC20Metadata
   - [Ext] totalSupply
   - [Ext] balanceOf

+ ERC20 (Context, IERC20, IERC20Metadata)
   - [Pub] #
   - [Pub] name
   - [Pub] symbol
   - [Pub] decimals
   - [Pub] totalSupply
   - [Pub] balanceOf
   - [Pub] transfer #
   - [Pub] allowance
   - [Pub] approve #
   - [Pub] transferFrom #
   - [Pub] increaseAllowance #
   - [Pub] decreaseAllowance #
   - [Int] _transfer #
   - [Int] _mint #
   - [Int] _burn #
   - [Int] _approve #
   - [Int] _beforeTokenTransfer #

+ DividendPayingToken (ERC20, Ownable, DividendPayingTokenInterface,
DividendPayingTokenOptionalInterface)
   - [Pub] <Constructor> #
      - modifiers: ERC20
   - [Pub] distributeADADDividends #
      - modifiers: onlyOwner
   - [Pub] withdrawDividend #
   - [Int] _withdrawDividendOfUser #
   - [Pub] dividendOf
   - [Pub] withdrawableDividendOf
   - [Pub] withdrawnDividendOf
   - [Pub] accumulativeDividendOf
   - [Int] _transfer #
   - [Int] _mint #
   - [Int] _burn #
   - [Int] _setBalance #

+ Antano (ERC20, Ownable)
   - [Pub] <Constructor> #
      - modifiers: ERC20
   - [Ext] <Fallback> $
   - [Pub] whitelistDxSale #
      - modifiers: onlyOwner
   - [Pub] updateDividendTracker #
      - modifiers: onlyOwner
   - [Pub] updateUniswapV2Router #
      - modifiers: onlyOwner
```

```
  - [Pub] excludeFromFees #
    - modifiers: onlyOwner
  - [Pub] excludeMultipleAccountsFromFees #
    - modifiers: onlyOwner
  - [Pub] setAutomatedMarketMakerPair #
    - modifiers: onlyOwner
  - [Prv] _setAutomatedMarketMakerPair #
  - [Ext] addToBlackList #
    - modifiers: onlyOwner
  - [Ext] removeFromBlackList #
    - modifiers: onlyOwner
  - [Pub] updateLiquidityWallet #
  - [Pub] updateGasForProcessing #
    - modifiers: onlyOwner
  - [Ext] updateClaimWait #
    - modifiers: onlyOwner
  - [Ext] getClaimWait
  - [Ext] getTotalDividendsDistributed
  - [Pub] isExcludedFromFees
  - [Pub] withdrawableDividendOf
  - [Pub] dividendTokenBalanceOf
  - [Ext] excludeFromDividends #
    - modifiers: onlyOwner
  - [Ext] getAccountDividendsInfo
  - [Ext] getAccountDividendsInfoAtIndex
  - [Ext] processDividendTracker #
  - [Ext] claim #
  - [Ext] getLastProcessedIndex
  - [Ext] getNumberOfDividendTokenHolders
  - [Int] _transfer #
  - [Prv] swapAndSendToFee #
  - [Prv] swapAndLiquify #
  - [Prv] swapTokensForEth #
  - [Prv] swapTokensForADA #
  - [Prv] addLiquidity #
  - [Prv] swapAndSendDividends #

+ AntanoDividendTracker (Ownable, DividendPayingToken)
  - [Pub] <Constructor> #
    - modifiers: DividendPayingToken
  - [Int] _transfer #
  - [Pub] withdrawDividend #
  - [Ext] excludeFromDividends #
    - modifiers: onlyOwner
  - [Ext] updateClaimWait #
    - modifiers: onlyOwner
  - [Ext] getLastProcessedIndex
  - [Ext] getNumberOfTokenHolders
  - [Pub] getAccount
  - [Pub] getAccountAtIndex
```

- [Prv] canAutoClaim
- [Ext] setBalance #
  - modifiers: onlyOwner
- [Pub] process #
- [Pub] processAccount #
  - modifiers: onlyOwner

4.4 Issues Checking Status

CHECKING ITEM	NOTES	RESULT
Arbitrary Jump with Function Type Variable	N / A	PASS
Arithmetic Accuracy Deviation	N / A	PASS
Assert Violation	N / A	PASS
Authorization through tx.origin	N / A	PASS
Business Logic	N / A	PASS
Code with No Effects	N / A	PASS
Critical Solidity Compiler	N / A	PASS
Delegatecall to Untrusted Callee	N / A	PASS
Design Logic	N / A	LOW RISK
DoS with Block Gas Limit	N / A	LOW RISK
DoS with Failed Call	N / A	PASS
Function Default Visibility	N / A	PASS
Hash Collisions With MVLA	N / A	PASS
Incorrect Constructor Name	N / A	PASS
Incorrect Inheritance Order	N / A	PASS
Integer Overflows and Underflows	N / A	PASS
Lack of Proper Signature Verification	N / A	PASS
Message Call with Hardcoded Gas Amount	N / A	PASS
Missing Protection Against SRA	N / A	PASS
Presence of Unused Variables	N / A	PASS
Reentrancy	N / A	PASS
Requirement Violation	N / A	PASS

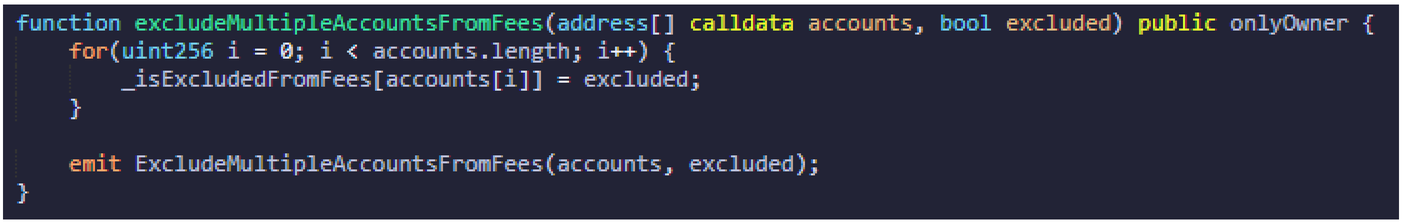
CHECKING ITEM	NOTES	RESULT
Right-To-Left-Override Control Character	N / A	PASS
Shadowing State Variables	N / A	PASS
Signature Malleability	N / A	PASS
State Variable Default Visibility	N / A	PASS
Timestamp Dependence	N / A	PASS
Transaction Order Dependence	N / A	PASS
Typographical Error	N / A	PASS
Unencrypted Private Data On-Chain	N / A	PASS
Unexpected Ether balance	N / A	PASS
Uninitialized Storage Pointer	N / A	PASS
Use of Deprecated Solidity Functions	N / A	PASS
Weak Sources of Randomness From CA	N / A	PASS
Write to Arbitrary Storage Location	N / A	PASS

Remark: To evaluate the risk, we go through a list of check items and each would be labeled with a severity category. For one check item, if our tool or analysis does not identify any issue, the contract is considered safe regarding the check item

4.5 Detailed Findings Information

[RISK] DoS with Block Gas Limit

- The function excludeMultipleAccountsFromFees uses the loop to exclude multiple accounts from fees. It also could be aborted with out-of-gas exception if there will be a long excluded addresses list.

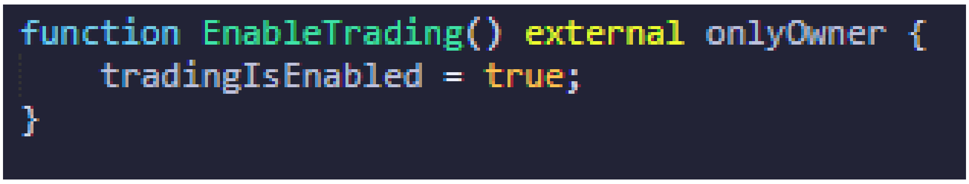


```
function excludeMultipleAccountsFromFees(address[] calldata accounts, bool excluded) public onlyOwner {
    for(uint256 i = 0; i < accounts.length; i++) {
        _isExcludedFromFees[accounts[i]] = excluded;
    }

    emit ExcludeMultipleAccountsFromFees(accounts, excluded);
}
```

Recommendation: Check that the excluded array length is not too big

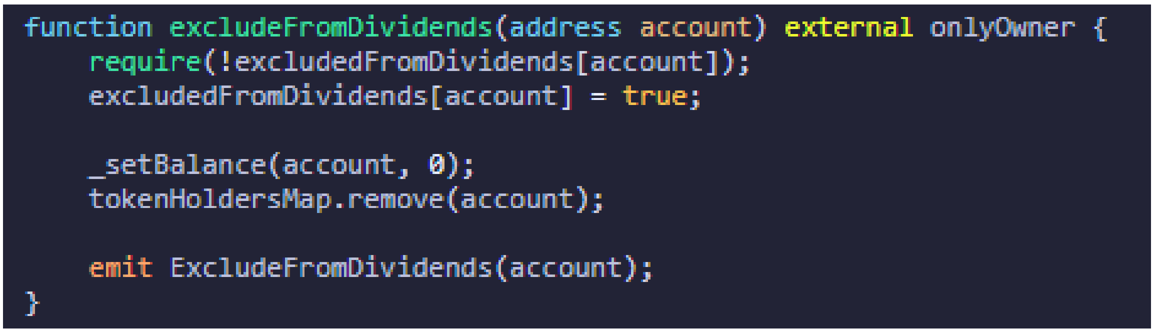
[RISK] Owner Privileges (in the period when the owner is not renounced)

- Owner can enable and disable trading.



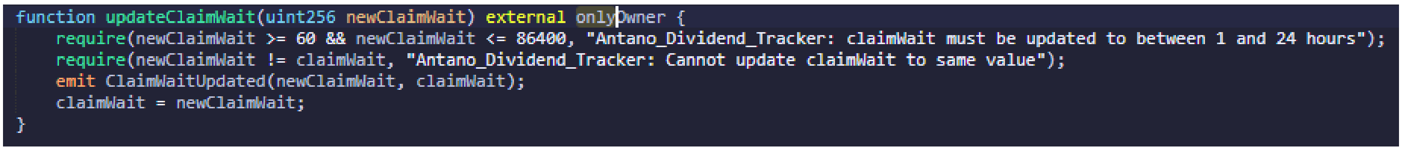
```
function EnableTrading() external onlyOwner {
    tradingIsEnabled = true;
}
```

- Owner can exclude from dividends.



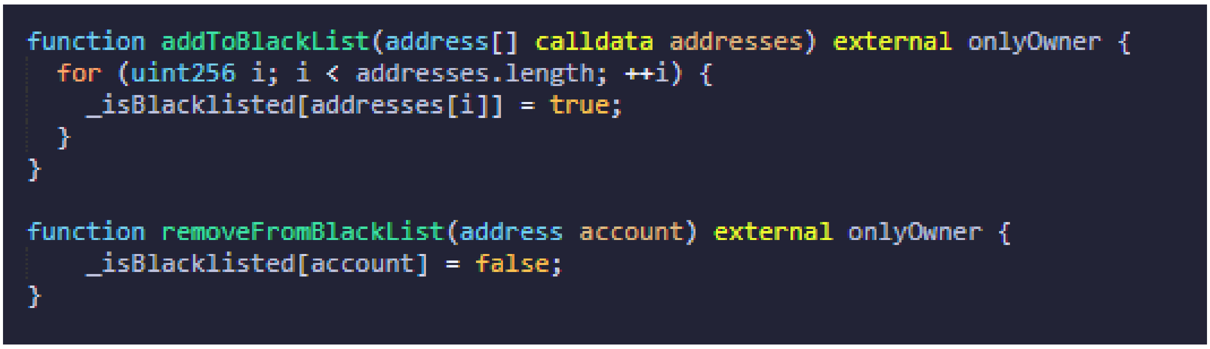
```
function excludeFromDividends(address account) external onlyOwner {
    require(!excludedFromDividends[account]);
    excludedFromDividends[account] = true;

    _setBalance(account, 0);
    tokenHoldersMap.remove(account);

    emit ExcludeFromDividends(account);
}
```

- Owner can update claimWait value.



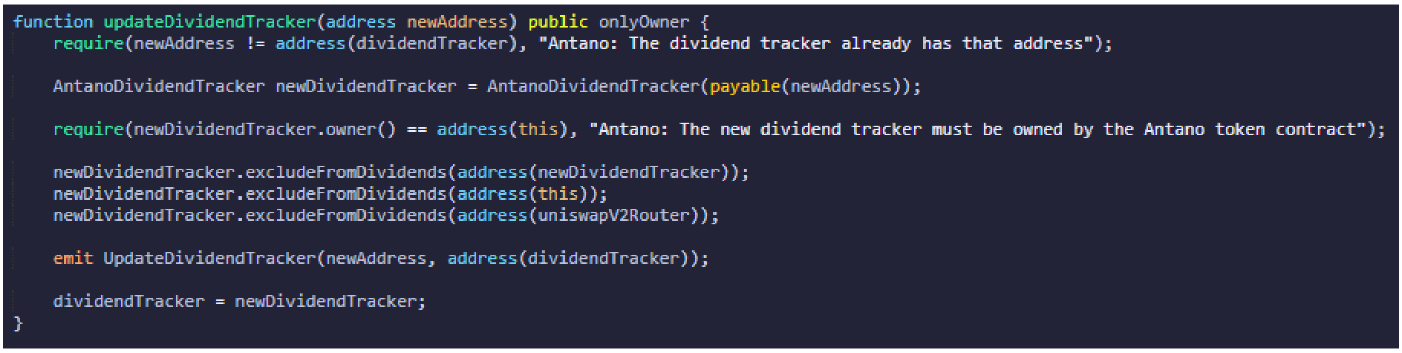
```
function updateClaimWait(uint256 newClaimWait) external onlyOwner {
    require(newClaimWait >= 60 && newClaimWait <= 86400, "Antano_Dividend_Tracker: claimWait must be updated to between 1 and 24 hours");
    require(newClaimWait != claimWait, "Antano_Dividend_Tracker: Cannot update claimWait to same value");
    emit ClaimWaitUpdated(newClaimWait, claimWait);
    claimWait = newClaimWait;
}
```

- The owner can add to blacklist addresses and remove from blacklist address.



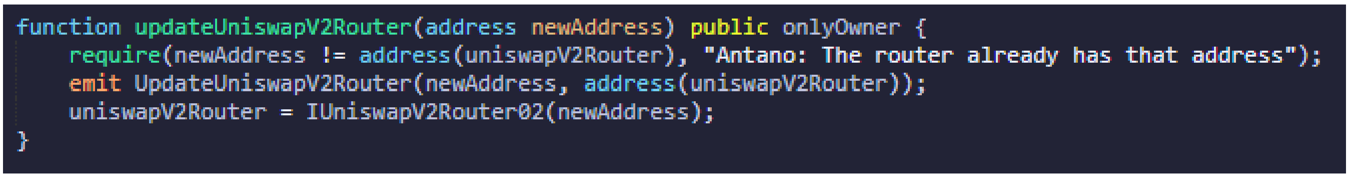
```
function addToBlackList(address[] calldata addresses) external onlyOwner {
  for (uint256 i; i < addresses.length; ++i) {
    _isBlacklisted[addresses[i]] = true;
  }
}

function removeFromBlackList(address account) external onlyOwner {
    _isBlacklisted[account] = false;
}
```

- Owner can change dividendTracker.



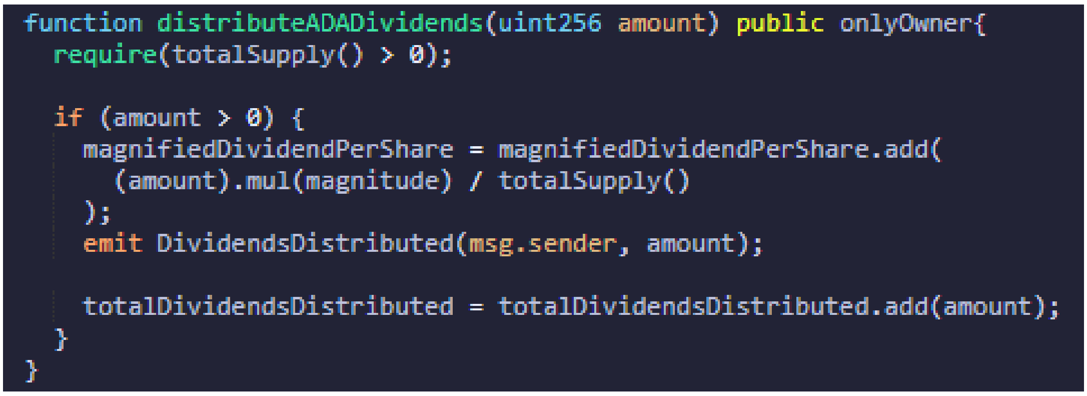
```
function updateDividendTracker(address newAddress) public onlyOwner {
    require(newAddress != address(dividendTracker), "Antano: The dividend tracker already has that address");

    AntanoDividendTracker newDividendTracker = AntanoDividendTracker(payable(newAddress));

    require(newDividendTracker.owner() == address(this), "Antano: The new dividend tracker must be owned by the Antano token contract");

    newDividendTracker.excludeFromDividends(address(newDividendTracker));
    newDividendTracker.excludeFromDividends(address(this));
    newDividendTracker.excludeFromDividends(address(uniswapV2Router));

    emit UpdateDividendTracker(newAddress, address(dividendTracker));

    dividendTracker = newDividendTracker;
}
```

- Owner can change Uniswap Router.



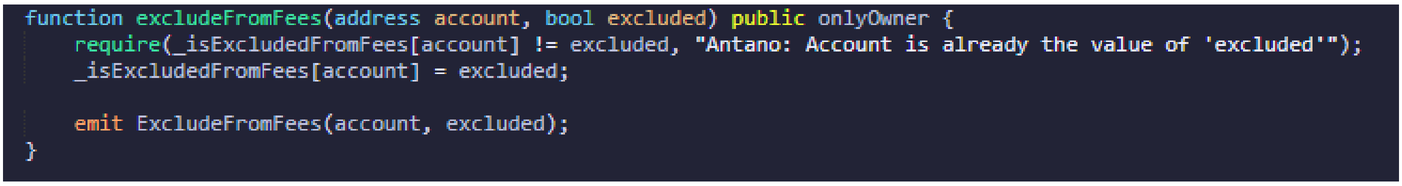
```
function updateUniswapV2Router(address newAddress) public onlyOwner {
    require(newAddress != address(uniswapV2Router), "Antano: The router already has that address");
    emit UpdateUniswapV2Router(newAddress, address(uniswapV2Router));
    uniswapV2Router = IUniswapV2Router02(newAddress);
}
```

- The owner of the contract can distribute ADA dividends (Cardano).



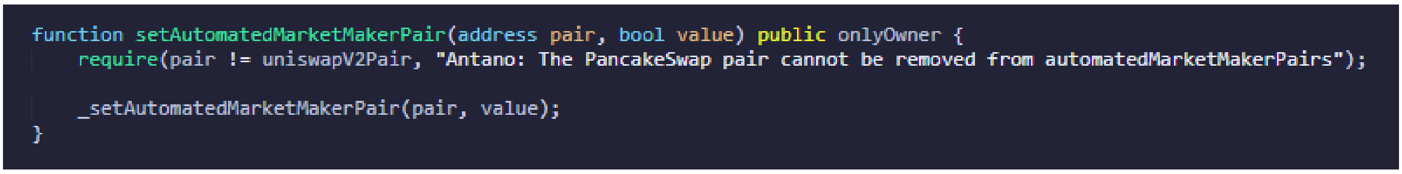
```
function distributeADADividends(uint256 amount) public onlyOwner{
  require(totalSupply() > 0);

  if (amount > 0) {
    magnifiedDividendPerShare = magnifiedDividendPerShare.add(
      (amount).mul(magnitude) / totalSupply()
    );
    emit DividendsDistributed(msg.sender, amount);

    totalDividendsDistributed = totalDividendsDistributed.add(amount);
  }
}
```

- The owner of the contract can exclude accounts from transfer fees and reward distribution.



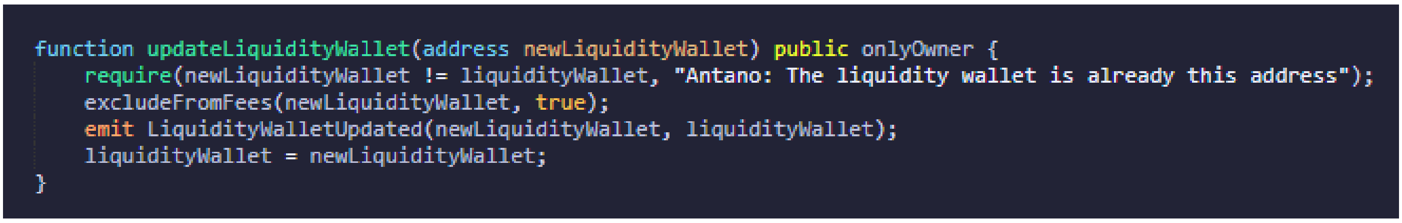
```
function excludeFromFees(address account, bool excluded) public onlyOwner {
    require(_isExcludedFromFees[account] != excluded, "Antano: Account is already the value of 'excluded'");
    _isExcludedFromFees[account] = excluded;

    emit ExcludeFromFees(account, excluded);
}
```

- Owner can exclude and include addresses in automatedMarketMakerPairs array.



```
function setAutomatedMarketMakerPair(address pair, bool value) public onlyOwner {
    require(pair != uniswapV2Pair, "Antano: The PancakeSwap pair cannot be removed from automatedMarketMakerPairs");

    _setAutomatedMarketMakerPair(pair, value);
}
```

- Owner can change liquidity wallet address.



```
function updateLiquidityWallet(address newLiquidityWallet) public onlyOwner {
    require(newLiquidityWallet != liquidityWallet, "Antano: The liquidity wallet is already this address");
    excludeFromFees(newLiquidityWallet, true);
    emit LiquidityWalletUpdated(newLiquidityWallet, liquidityWallet);
    liquidityWallet = newLiquidityWallet;
}
```

5 Audit Result

LEVEL	ISSUES
🟩 Weakness	**DoS with Block Gas Limit (1)**
🟥 High	**Owner Privilegies (9)**

1. The contract utilizes SafeMath libraries along with following the ERC20 standard.

2. The owner is able to update the Dividend Tracker and UniswapV2Router contract addresses at any time. So that logic of setBalance and other functions could be another and not audited.

3. The owner is able to exclude any address from dividends at any time.

4. The owner has the ability to enable and disable trading. Only the owner is capable of utilizing transfer functionality while trading is disabled.

5. There is a 'tax fee', 'liquidity fee' and ‘cardano fee’ on all transactions for any non-excluded address that participates in a transfer. The owner has the ability to modify these fees at any time.

6. A portion of the fees is redistributed to existing token holders instantly and automatically at the time of each transaction.

7. The owner of the contract can exclude accounts from transfer fees and reward distribution.

8. Ownership has not been renounced.

5.1 Findings Summary

🟥

Antano

High Risk Level

✓ **No external vulnerabilities were identified within the smart contract's code**

✓ **We strongly recommend that the team renounces ownership**

✓ **Please ensure trust in the team prior to investing as they have substantial control within the ecosystem**

✓ **We strongly recommend that the contract owners remove errors and re-audit**

6 Disclamer

CheckPoint team issues this report with reference to the facts that have occurred or existed before the issuance of this report, and only assumes corresponding responsibility based on these. For the facts that occurred or existed after the issuance, CheckPoint is not able to judge the security status of this project, and is not responsible for them. The security audit analysis and other contents of this report are based on the documents and materials provided to CheckPoint by the information provider till the date of the insurance report. CheckPoint is not responsible for the background and other conditions of the project.

This security audit is not produced to supplant any other type of assessment and does not guarantee the discovery of all security vulnerabilities within the scope of the assessment. However, we warrant that this audit is conducted with goodwill, professional approach, and competence. Since an assessment from one single party cannot be confirmed to cover all possible issues within the smart contract(s), CheckPoint suggests conducting multiple independent assessments to minimize the risks. Lastly, nothing contained in this audit report should be considered as investment advice.

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