auditace.tech

AuditAce

FROM INCEPTION TO SUCCESS

Smart Contract Audit

FOR

PIKACHU

DATED : 16 MAY 23'

AUDIT SUMMARY

Project name – PIKACHU

Date: 16 May, 2023

Scope of Audit- Audit Ace was consulted to conduct the smart contract audit of the solidity source codes.

Audit Status: Passed

Issues Found

Status	Critical	High	Medium	Low	Suggestion
Open	0	0	0	0	2
Acknowledged	0	0	0	0	0
Resolved	0	0	0	0	0

USED TOOLS

Tools:

1.Manual Review: The code has undergone a line-by-line review by the **Ace** team.

2.BSC Test Network: All tests were conducted on the BSC Test network, and each test has a corresponding transaction attached to it. These tests can be found in the "Functional Tests" section of the report.

3.Slither: The code has undergone static analysis using Slither.

Testnet version:

The tests were performed using the contract deployed on the BSC Testnet, which can be found at the following address:
https://testnet.bscscan.com/token/0xD1c34E46aD55DA2a7bb86EA32a48C15d8d1Ef9CF

Payments Made :

https://bscscan.com/tx/0xbef93ec2e2ceb8742da080153ee186d077d9a0fb808bac3ccdd2a5da487f0c2a

Token Information

Name : Pikachu Inu

Symbol : PIKACHU

Decimals: 9

Network: BSC

Token Type: BEP20

Token Address:
0x21071e9F38C01FA3Ad46D4f77812c99e5c722CAD

Owner:
0xE732Db3E12953b5d7b0C077d429927b5B3c85682 **(at time of writing the audit)**

Deployer:0xE732Db3E12953b5d7b0C077d429927b5B3c85682

Token Information

Fees:

Buy Fees: 10%

Sell Fees: 10%

Transfer Fees: 10%

Fees Privilige: None

Ownership : Owned

Minting: None

Max Tx Amount/ Max Wallet Amount: No

Blacklist: No

Other Priviliges: Including and excluding form fee

AUDIT METHODOLOGY

The auditing process will follow a routine as special considerations by Auditace:

- Review of the specifications, sources, and instructions provided to Auditace to make sure the contract logic meets the intentions of the client without exposing the user's funds to risk.

- Manual review of the entire codebase by our experts, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.

- Specification comparison is the process of checking whether the code does what the specifications, sources, and instructions provided to Auditace describe.

- Test coverage analysis determines whether the test cases are covering the code and how much code isexercised when we run the test cases.

- Symbolic execution is analysing a program to determine what inputs cause each part of a program to execute.

- Reviewing the codebase to improve maintainability, security, and control based on the established industry and academic practices.

VULNERABILITY CHECKLIST

- ✓ Return values of low-level calls
- ✓ Private modifier
- ✓ Multiple Sends
- ✓ Using Suicide
- ✓ Gas Limitand Loops
- ✓ Address hardcoded
- ✓ Exception Disorder
- ✓ Using inline assembly
- ✓ Divide before multiply
- ✓ Missing Zero Address Validation
- ✓ Compiler version not fixed
- ✓ **Gasless Send**
- ✓ Using block.timestamp
- ✓ Re-entrancy
- ✓ Tautology or contradiction
- ✓ Timestamp Dependence
- ✓ Revert/require functions
- ✓ Use of tx.origin
- ✓ Integer overflow/underflow
- ✓ Dangerous strict equalities
- ✓ Using SHA3
- ✓ Using throw

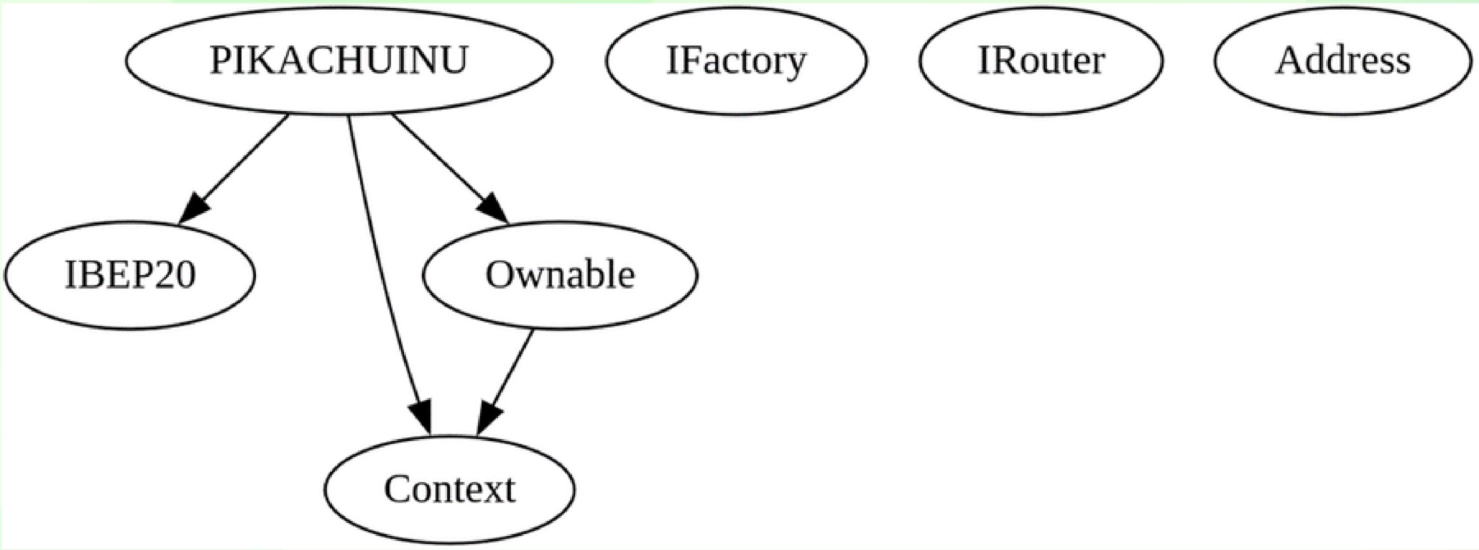
CLASSIFICATION OF RISK

Severity	Description
◆ Critical	These vulnerabilities could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
◆ High-Risk	A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way.
◆ Medium-Risk	A vulnerability that could affect the desired outcome of executing the contract in a specific scenario.
◆ Low-Risk	A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective.
◆ Gas Optimization /Suggestion	A vulnerability that has an informational character but is not affecting any of the code.

Findings

Severity	Found
◆ Critical	0
◆ High-Risk	0
◆ Medium-Risk	0
◆ Low-Risk	0
◆ Gas Optimization / Suggestions	2

INHERITANCE TREE



POINTS TO NOTE

- Owner is not able to modify fees (10% buy/sell/transfers)
- Owner must enable trading for investors to be able to trade
- Owner is not able to set max buy/sell/transfer/hold amount
- Owner is not able to blacklist an arbitrary wallet
- Owner is not able to disable trades
- Owner is not able to mint new tokens

CONTRACT ASSESMENT

```
| Contract |       Type        |       Bases       |                  |                 |
|:----------:|:-------------------:|:----------------:|:----------------:|:---------------:|
|     └      |  **Function Name**  |  **Visibility**  |  **Mutability**  |  **Modifiers**  |
||||||
| **IBEP20** | Interface |  |||
| └ | totalSupply | External ❗️ |   |NO❗️ |
| └ | balanceOf | External ❗️ |   |NO❗️ |
| └ | transfer | External ❗️ | 🛑  |NO❗️ |
| └ | allowance | External ❗️ |   |NO❗️ |
| └ | approve | External ❗️ | 🛑  |NO❗️ |
| └ | transferFrom | External ❗️ | 🛑  |NO❗️ |
||||||
| **Context** | Implementation |  |||
| └ | _msgSender | Internal 🔒 |   | |
| └ | _msgData | Internal 🔒 |   | |
||||||
| **Ownable** | Implementation | Context |||
| └ | <Constructor> | Public ❗️ | 🛑  |NO❗️ |
| └ | owner | Public ❗️ |   |NO❗️ |
| └ | renounceOwnership | Public ❗️ | 🛑  | onlyOwner |
| └ | _setOwner | Private 🔐 | 🛑  | |
||||||
| **IFactory** | Interface |  |||
| └ | createPair | External ❗️ | 🛑  |NO❗️ |
||||||
| **IRouter** | Interface |  |||
| └ | factory | External ❗️ |   |NO❗️ |
| └ | WETH | External ❗️ |   |NO❗️ |
| └ | addLiquidityETH | External ❗️ |  💵 |NO❗️ |
| └ | swapExactTokensForETHSupportingFeeOnTransferTokens | External ❗️ | 🛑  |NO❗️ |
||||||
| **Address** | Library |  |||
| └ | sendValue | Internal 🔒 | 🛑  | |
||||||
| **PIKACHUINU** | Implementation | Context, IBEP20, Ownable |||
| └ | <Constructor> | Public ❗️ | 🛑  |NO❗️ |
| └ | name | Public ❗️ |   |NO❗️ |
| └ | symbol | Public ❗️ |   |NO❗️ |
| └ | decimals | Public ❗️ |   |NO❗️ |
| └ | totalSupply | Public ❗️ |   |NO❗️ |
| └ | balanceOf | Public ❗️ |   |NO❗️ |
| └ | allowance | Public ❗️ |   |NO❗️ |
```

CONTRACT ASSESMENT

```
| └ | approve | Public ❗ | 🛑 |NO❗ |
| └ | transferFrom | Public ❗ | 🛑 |NO❗ |
| └ | increaseAllowance | Public ❗ | 🛑 |NO❗ |
| └ | decreaseAllowance | Public ❗ | 🛑 |NO❗ |
| └ | transfer | Public ❗ | 🛑 |NO❗ |
| └ | isExcludedFromReward | Public ❗ | |NO❗ |
| └ | reflectionFromToken | Public ❗ | |NO❗ |
| └ | tokenFromReflection | Public ❗ | |NO❗ |
| └ | excludeFromReward | Public ❗ | 🛑 | onlyOwner |
| └ | includeInReward | External ❗ | 🛑 | onlyOwner |
| └ | excludeFromFee | Public ❗ | 🛑 | onlyOwner |
| └ | includeInFee | Public ❗ | 🛑 | onlyOwner |
| └ | isExcludedFromFee | Public ❗ | |NO❗ |
| └ | _reflectRfi | Private 🔐 | 🛑 | |
| └ | _takeMarketing | Private 🔐 | 🛑 | |
| └ | _getValues | Private 🔐 | | |
| └ | _getTValues | Private 🔐 | | |
| └ | _getRValues | Private 🔐 | | |
| └ | _getRate | Private 🔐 | | |
| └ | _getCurrentSupply | Private 🔐 | | |
| └ | _approve | Private 🔐 | 🛑 | |
| └ | _transfer | Private 🔐 | 🛑 | |
| └ | _tokenTransfer | Private 🔐 | 🛑 | |
| └ | swapAndLiquify | Private 🔐 | 🛑 | lockTheSwap |
| └ | swapTokensForBNB | Private 🔐 | 🛑 | |
| └ | bulkExcludeFee | External ❗ | 🛑 | onlyOwner |
| └ | <Receive Ether> | External ❗ | 💵 |NO❗ |
||||||
| **DividendPayingToken** | Implementation | ERC20, DividendPayingTokenInterface, Ownable |||
| └ | <Constructor> | Public ❗ | 🛑 | ERC20 |
| └ | <Receive Ether> | External ❗ | 💵 |NO❗ |
| └ | distributeDividends | Public ❗ | 💵 |NO❗ |
| └ | _withdrawDividendOfUser | Internal 🔒 | 🛑 | |
| └ | setRewardToken | External ❗ | 🛑 | onlyOwner |
| └ | swapBnbForCustomToken | Internal 🔒 | 🛑 | |
| └ | dividendOf | Public ❗ | |NO❗ |
| └ | withdrawableDividendOf | Public ❗ | |NO❗ |
| └ | withdrawnDividendOf | Public ❗ | |NO❗ |
| └ | accumulativeDividendOf | Public ❗ | |NO❗ |
| └ | _transfer | Internal 🔒 | 🛑 | |
| └ | _tokengeneration | Internal 🔒 | 🛑 | |
```

CONTRACT ASSESMENT

```
| └ | _burn | Internal 🔒 | 🛑  | |
| └ | _setBalance | Internal 🔒 | 🛑  | |
||||||
| **ERC20** | Implementation | Context, IERC20, IERC20Metadata |||
| └ | <Constructor> | Public ❗️ | 🛑  |NO ❗️ |
| └ | name | Public ❗️ |   |NO ❗️ |
| └ | symbol | Public ❗️ |   |NO ❗️ |
| └ | decimals | Public ❗️ |   |NO ❗️ |
| └ | totalSupply | Public ❗️ |   |NO ❗️ |
| └ | balanceOf | Public ❗️ |   |NO ❗️ |
| └ | transfer | Public ❗️ | 🛑  |NO ❗️ |
| └ | allowance | Public ❗️ |   |NO ❗️ |
| └ | approve | Public ❗️ | 🛑  |NO ❗️ |
| └ | transferFrom | Public ❗️ | 🛑  |NO ❗️ |
| └ | increaseAllowance | Public ❗️ | 🛑  |NO ❗️ |
| └ | decreaseAllowance | Public ❗️ | 🛑  |NO ❗️ |
| └ | _transfer | Internal 🔒 | 🛑  | |
| └ | _tokengeneration | Internal 🔒 | 🛑  | |
| └ | _burn | Internal 🔒 | 🛑  | |
| └ | _approve | Internal 🔒 | 🛑  | |
| └ | _beforeTokenTransfer | Internal 🔒 | 🛑  | |
||||||
| **IERC20** | Interface |  |||
| └ | totalSupply | External ❗️ |   |NO ❗️ |
| └ | balanceOf | External ❗️ |   |NO ❗️ |
| └ | transfer | External ❗️ | 🛑  |NO ❗️ |
| └ | allowance | External ❗️ |   |NO ❗️ |
| └ | approve | External ❗️ | 🛑  |NO ❗️ |
| └ | transferFrom | External ❗️ | 🛑  |NO ❗️ |
||||||
| **IERC20Metadata** | Interface | IERC20 |||
| └ | name | External ❗️ |   |NO ❗️ |
| └ | symbol | External ❗️ |   |NO ❗️ |
| └ | decimals | External ❗️ |   |NO ❗️ |
||||||
| **Context** | Implementation |  |||
| └ | _msgSender | Internal 🔒 |   | |
| └ | _msgData | Internal 🔒 |   | |
||||||
| **SafeMath** | Library |  |||
| └ | add | Internal 🔒 |   | |
| └ | sub | Internal 🔒 |   | |
```

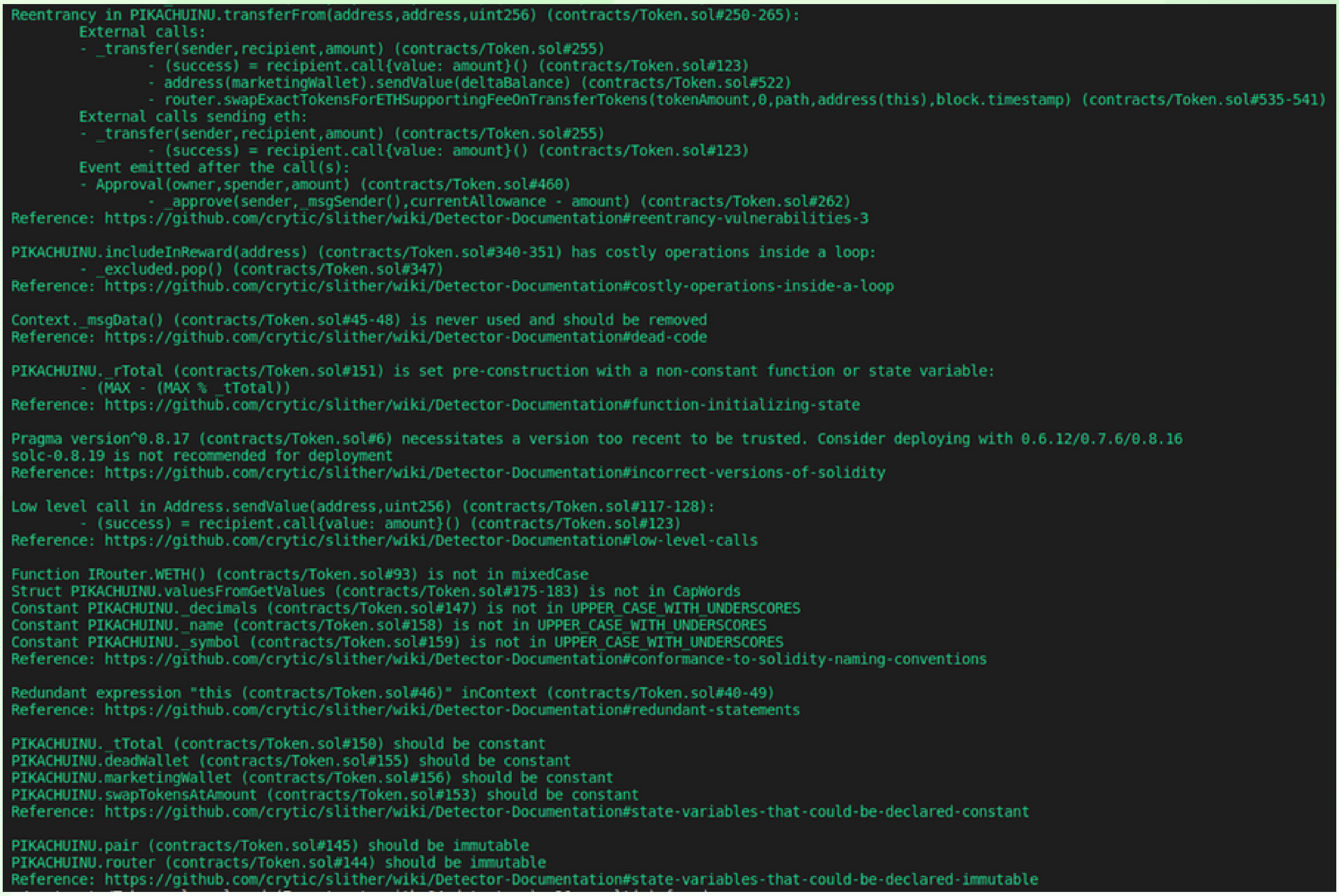
└	sub	Internal 🔒		
└	mul	Internal 🔒		
└	div	Internal 🔒		
└	div	Internal 🔒		
└	mod	Internal 🔒		
└	mod	Internal 🔒		
SafeMathInt	Library			
└	mul	Internal 🔒		
└	div	Internal 🔒		
└	sub	Internal 🔒		
└	add	Internal 🔒		
└	abs	Internal 🔒		
└	toUint256Safe	Internal 🔒		
SafeMathUint	Library			
└	toInt256Safe	Internal 🔒		
DividendPayingTokenInterface	Interface			
└	dividendOf	External ❗		NO ❗
└	distributeDividends	External ❗	💵	NO ❗
└	withdrawableDividendOf	External ❗		NO ❗
└	withdrawnDividendOf	External ❗		NO ❗
└	accumulativeDividendOf	External ❗		NO ❗
Ownable	Implementation	Context		
└	<Constructor>	Public ❗	🛑	NO ❗
└	owner	Public ❗		NO ❗
└	renounceOwnership	Public ❗	🛑	onlyOwner
└	transferOwnership	Public ❗	🛑	onlyOwner
IPair	Interface			
└	sync	External ❗	🛑	NO ❗
IFactory	Interface			
└	createPair	External ❗	🛑	NO ❗
└	getPair	External ❗		NO ❗
IRouter	Interface			
└	factory	External ❗		NO ❗
└	WETH	External ❗		NO ❗
└	addLiquidityETH	External ❗	💵	NO ❗
└	swapExactTokensForTokensSupportingFeeOnTransferTokens	External ❗	🛑	NO ❗

└	swapExactETHForTokens	External ❗	💵	NO ❗
└	swapExactTokensForETHSupportingFeeOnTransferTokens	External ❗	🛑	NO ❗

Legend

Symbol	Meaning
🛑	Function can modify state
💵	Function is payable

STATIC ANALYSIS



```
Reentrancy in PIKACHUINU.transferFrom(address,address,uint256) (contracts/Token.sol#250-265):
        External calls:
        - _transfer(sender,recipient,amount) (contracts/Token.sol#255)
                - (success) = recipient.call{value: amount}() (contracts/Token.sol#123)
                - address(marketingWallet).sendValue(deltaBalance) (contracts/Token.sol#522)
                - router.swapExactTokensForETHSupportingFeeOnTransferTokens(tokenAmount,0,path,address(this),block.timestamp) (contracts/Token.sol#535-541)
        External calls sending eth:
        - _transfer(sender,recipient,amount) (contracts/Token.sol#255)
                - (success) = recipient.call{value: amount}() (contracts/Token.sol#123)
        Event emitted after the call(s):
        - Approval(owner,spender,amount) (contracts/Token.sol#460)
                - _approve(sender,_msgSender(),currentAllowance - amount) (contracts/Token.sol#262)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-3

PIKACHUINU.includeInReward(address) (contracts/Token.sol#340-351) has costly operations inside a loop:
        - _excluded.pop() (contracts/Token.sol#347)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#costly-operations-inside-a-loop

Context._msgData() (contracts/Token.sol#45-48) is never used and should be removed
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code

PIKACHUINU._rTotal (contracts/Token.sol#151) is set pre-construction with a non-constant function or state variable:
        - (MAX - (MAX % _tTotal))
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#function-initializing-state

Pragma version^0.8.17 (contracts/Token.sol#6) necessitates a version too recent to be trusted. Consider deploying with 0.6.12/0.7.6/0.8.16
solc-0.8.19 is not recommended for deployment
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity

Low level call in Address.sendValue(address,uint256) (contracts/Token.sol#117-128):
        - (success) = recipient.call{value: amount}() (contracts/Token.sol#123)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#low-level-calls

Function IRouter.WETH() (contracts/Token.sol#93) is not in mixedCase
Struct PIKACHUINU.valuesFromGetValues (contracts/Token.sol#175-183) is not in CapWords
Constant PIKACHUINU._decimals (contracts/Token.sol#147) is not in UPPER_CASE_WITH_UNDERSCORES
Constant PIKACHUINU._name (contracts/Token.sol#158) is not in UPPER_CASE_WITH_UNDERSCORES
Constant PIKACHUINU._symbol (contracts/Token.sol#159) is not in UPPER_CASE_WITH_UNDERSCORES
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#conformance-to-solidity-naming-conventions

Redundant expression "this (contracts/Token.sol#46)" inContext (contracts/Token.sol#40-49)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#redundant-statements

PIKACHUINU._tTotal (contracts/Token.sol#150) should be constant
PIKACHUINU.deadWallet (contracts/Token.sol#155) should be constant
PIKACHUINU.marketingWallet (contracts/Token.sol#156) should be constant
PIKACHUINU.swapTokensAtAmount (contracts/Token.sol#153) should be constant
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-constant

PIKACHUINU.pair (contracts/Token.sol#145) should be immutable
PIKACHUINU.router (contracts/Token.sol#144) should be immutable
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-immutable
```

Static Analysis

an static analysis of the code were performed using slither. No issues were found

FUNCTIONAL TESTING

Router (PCS V2):
0xD99D1c33F9fC3444f8101754aBC46c52416550D1

All the functionalities have been tested, no issues were found

1- Adding liquidity (passed):
https://testnet.bscscan.com/tx/0x0441a076db0d74dad7dd62d141016f80b5650cbbad1599f0f49bee179fdb53f2

2- Buying when excluded (0% tax) (passed):
https://testnet.bscscan.com/tx/0x7eac4b26887170295ab7b7b562e65b582e00c73909a457019e44c1768d5b0f01

3- Selling when excluded (0% tax) (passed):
https://testnet.bscscan.com/tx/0x76b5ca9d605ff5454b8943dedcad3bfb01c1c4752d83bc1dcbf5c765b432d589

4- Transferring when excluded from fees (0% tax) (passed):
https://testnet.bscscan.com/tx/0x2e28f782399d6f863d0db17cfbe80aca505215bf7e5e6870a3c9e8845c15cc2c

5- Buying when not excluded from fees (10% tax) (passed):
https://testnet.bscscan.com/tx/0x5cb0f9e10e398faedf7a51c5d2b683714dd6982daa3af13a25bd9aaa3cc90c6d

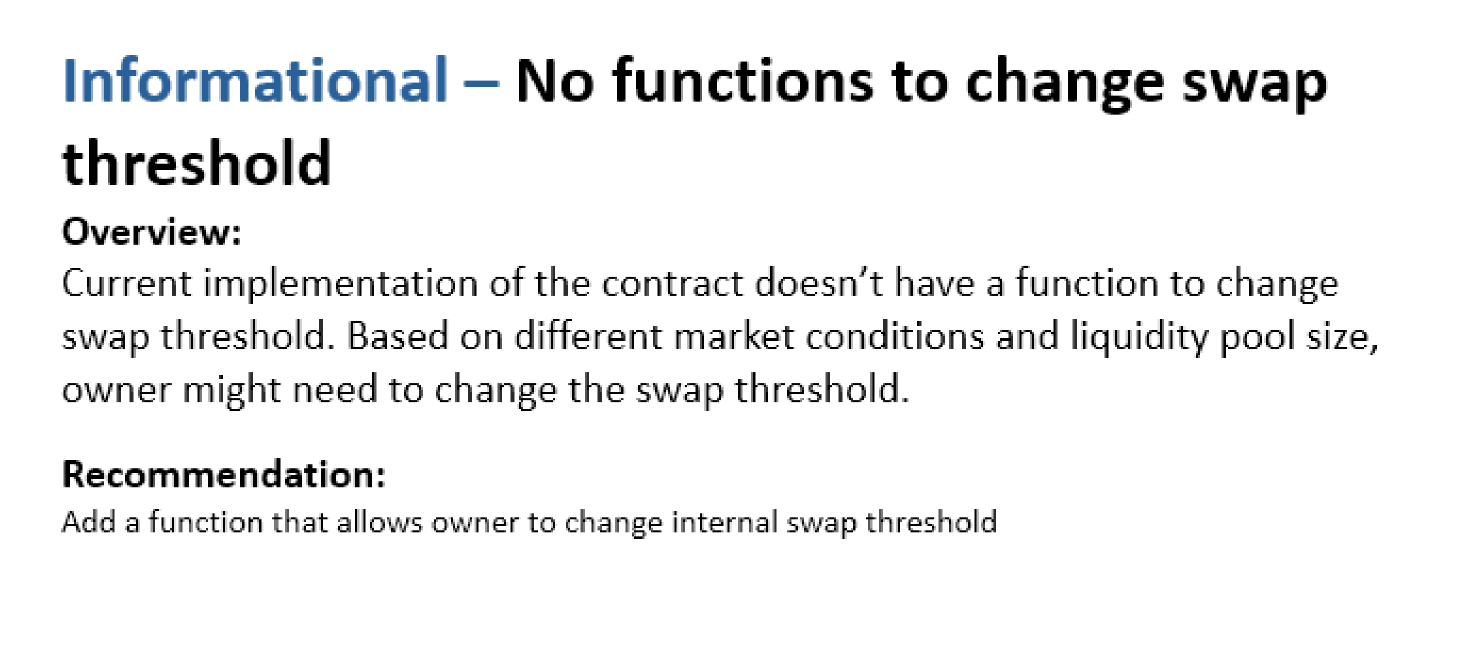
6- Selling when not excluded from fees (10% tax) (passed):
https://testnet.bscscan.com/tx/0xc0c6b49c2525ceae65ba599cc794e95d411896d1d1c16d515fe8138f04ea5ad8

7- Transferring when not excluded from fees (10% tax) (passed):
https://testnet.bscscan.com/tx/0x8fc4f551c966574d8f9071b473e7afb490d02e72e690bd40d0e8e109567b99dc

FUNCTIONAL TESTING

8- Internal swap (passed):
marketing wallet received Rewards
https://testnet.bscscan.com/token/0xD1c34E46aD55DA2a7bb86EA32a48C15d8d1Ef9CF

FUNCTIONAL TESTING



Informational – No functions to change swap threshold

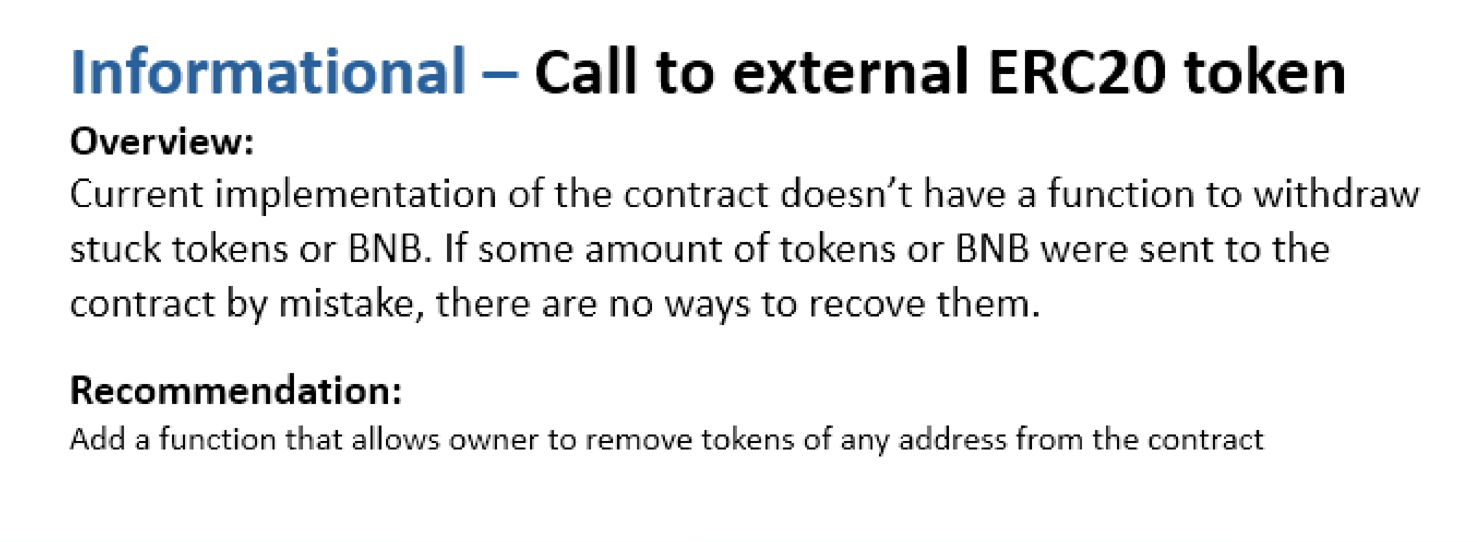
Overview:

Current implementation of the contract doesn’t have a function to change swap threshold. Based on different market conditions and liquidity pool size, owner might need to change the swap threshold.

Recommendation:

Add a function that allows owner to change internal swap threshold

FUNCTIONAL TESTING



Informational – Call to external ERC20 token

Overview:

Current implementation of the contract doesn’t have a function to withdraw stuck tokens or BNB. If some amount of tokens or BNB were sent to the contract by mistake, there are no ways to recove them.

Recommendation:

Add a function that allows owner to remove tokens of any address from the contract

DISCLAIMER

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