



Smart Contract Audit

FOR

zkPepe

DATED : 8 May 23'



AUDIT SUMMARY

Project name - zkPepe

Date: 8 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	1
Acknowledged	0	0	0	0	0
Resolved	0	1	0	0	0



USED TOOLS

Tools:

1- Manual Review:

A line by line code review has been performed by audit 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/0xf0cddc483f04b18f6e0ad1a7fabb342c8cad6a43>



Token Information

Token Name: zkPepe

Token Symbol: zkPepe

Decimals: 18

Token Supply: 420,690,000,000,000

Token Address:

0x577B5C53c8fAe6f5487F3781ee839fb8Fbe86Fc2

Checksum:

80b4b14b6f2ec91de8765d5ba8fe52cf73411863

Owner:

0x7075028c83801F6abbEf3DeFB9C5f10d8a35fD52

(at time of writing the audit)

Deployer:

0x7075028c83801F6abbEf3DeFB9C5f10d8a35fD52



TOKEN OVERVIEW

Fees:

Buy Fees: up to 8%

Sell Fees: up to 8%

Transfer Fees: up to 8%

Fees Privilege: Owner

Ownership: Owned

Minting: No mint function

Max Tx Amount/ Max Wallet Amount: No

Blacklist: No

Other Privileges: changing swap threshold - changing fees - enabling trades



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 is exercised 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



Gasless Send



Private modifier



Using block.timestamp



Multiple Sends



Re-entrancy



Using Suicide



Tautology or contradiction



Gas Limit and Loops



Timestamp Dependence



Address hardcoded



Revert/require functions



Exception Disorder



Use of tx.origin



Using inline assembly



Integer overflow/underflow



Divide before multiply



Dangerous strict equalities



Missing Zero Address Validation



Using SHA3



Compiler version not fixed



Using throw



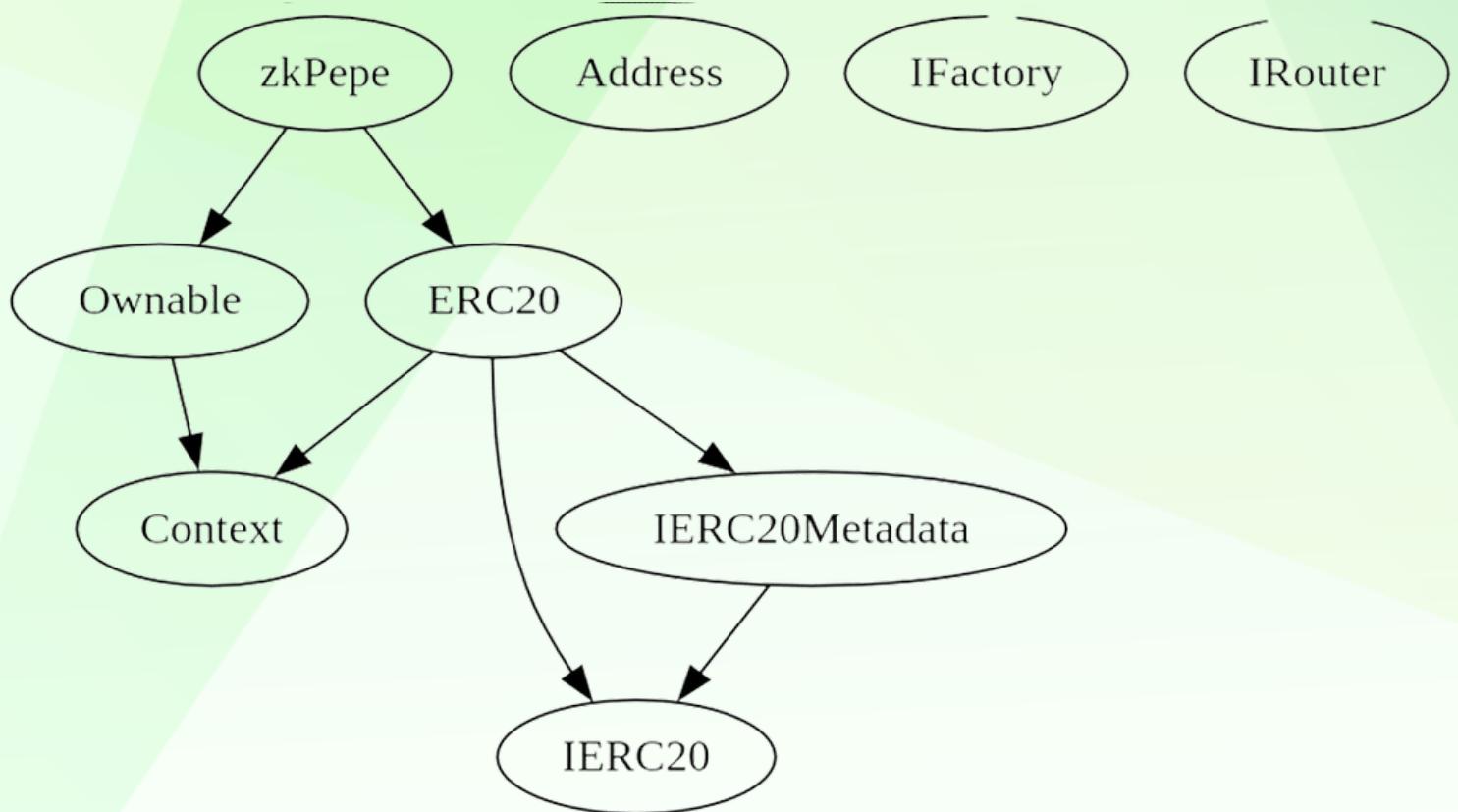
CLASSIFICATION OF RISK

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	1
◆ Medium-Risk	0
◆ Low-Risk	0
◆ Gas Optimization / Suggestions	1

INHERITANCE TREE





POINTS TO NOTE

- Owner is not able to set buy/sell/transfer tax more than 8% each
- Owner is not able to set a max buy/transfer/wallet/sell 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
- Owner must enable trades for holders to be able to trade



CONTRACT ASSESSMENT

Contract	Type	Bases			
			Function Name	**Visibility**	**Mutability**
					Modifiers
			Mutability	**Modifiers**	
			Context	Implementation	
	L	_msgSender	Internal	🔒	
	L	_msgData	Internal	🔒	
			IERC20	Interface	
	L	totalSupply	External	!	NO !
	L	balanceOf	External	!	NO !
	L	transfer	External	!	● NO !
	L	allowance	External	!	NO !
	L	approve	External	!	● NO !
	L	transferFrom	External	!	● NO !
			IERC20Metadata	Interface	IERC20
	L	name	External	!	NO !
	L	symbol	External	!	NO !
	L	decimals	External	!	NO !
			ERC20	Implementation	Context, IERC20, IERC20Metadata
	L	<Constructor>	Public	!	● NO !
	L	name	Public	!	NO !
	L	symbol	Public	!	NO !
	L	decimals	Public	!	NO !
	L	totalSupply	Public	!	NO !
	L	balanceOf	Public	!	NO !
	L	transfer	Public	!	● NO !
	L	allowance	Public	!	NO !
	L	approve	Public	!	● NO !
	L	transferFrom	Public	!	● NO !
	L	increaseAllowance	Public	!	● NO !
	L	decreaseAllowance	Public	!	● NO !
	L	_transfer	Internal	🔒	
	L	_tokengeneration	Internal	🔒	
	L	_approve	Internal	🔒	
			Address	Library	
	L	sendValue	Internal	🔒	
			Ownable	Implementation	Context
	L	<Constructor>	Public	!	● NO !



CONTRACT ASSESSMENT

```
| L | owner | Public ! | NO ! | |
| L | renounceOwnership | Public ! | ● | onlyOwner |
| L | transferOwnership | Public ! | ● | onlyOwner |
| L | _setOwner | Private 🔑 | ● | |
|||||
| **IFactory** | Interface | ||
| L | createPair | External ! | ● | NO ! |
|||||
| **IRouter** | Interface | ||
| L | factory | External ! | NO ! |
| L | WETH | External ! | NO ! |
| L | addLiquidityETH | External ! | 💸 | NO ! |
| L | swapExactTokensForETHSupportingFeeOnTransferTokens | External ! | ● | NO ! |
|||||
| **zkPepe** | Implementation | ERC20, Ownable ||
| L | <Constructor> | Public ! | ● | ERC20 |
| L | approve | Public ! | ● | NO ! |
| L | transferFrom | Public ! | ● | NO ! |
| L | increaseAllowance | Public ! | ● | NO ! |
| L | decreaseAllowance | Public ! | ● | NO ! |
| L | transfer | Public ! | ● | NO ! |
| L | _transfer | Internal 🔑 | ● | |
| L | Liquify | Private 🔑 | ● | lockTheSwap |
| L | swapTokensForETH | Private 🔑 | ● | |
| L | addLiquidity | Private 🔑 | ● | |
| L | updateLiquidityProvide | External ! | ● | onlyOwner |
| L | updateLiquidityTreshhold | External ! | ● | onlyOwner |
| L | EnableTrading | External ! | ● | onlyOwner |
| L | UpdateZeroBuyTax | External ! | ● | onlyOwner |
| L | UpdateZeroSellTax | External ! | ● | onlyOwner |
| L | SetBuyTax | External ! | ● | onlyOwner |
| L | SetSellTax | External ! | ● | onlyOwner |
| L | UpdateTxTax | External ! | ● | onlyOwner |
| L | updatedeadline | External ! | ● | onlyOwner |
| L | updateMarketingWallet | External ! | ● | onlyOwner |
| L | updateDevWallet | External ! | ● | onlyOwner |
| L | updateExemptFee | External ! | ● | onlyOwner |
| L | bulkExemptFee | External ! | ● | onlyOwner |
| L | rescueBNB | External ! | ● | onlyOwner |
| L | rescueBEP20 | External ! | ● | onlyOwner |
| L | <Receive Ether> | External ! | 💸 | NO ! |
```

CONTRACT ASSESSMENT

Legend

Symbol	Meaning
●	Function can modify state
💵	Function is payable



STATIC ANALYSIS

```
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-3
Context._msgData() (contracts/Token.sol#22-25) is never used and should be removed
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code
Pragma version^0.8.17 (contracts/Token.sol#15) 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#346-357):
- (success) = recipient.call{value: amount}() (contracts/Token.sol#352)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#low-level-calls
Variable ERC20._balances (contracts/Token.sol#78) is not in mixedCase
Variable ERC20._allowances (contracts/Token.sol#80) is not in mixedCase
Function IRouter.WETH() (contracts/Token.sol#410) is not in mixedCase
Contract zkPepe (contracts/Token.sol#433-775) is not in CapWords
Function zkPepe.Liquify(uint256,zkPepe.Taxes) (contracts/Token.sol#609-653) is not in mixedCase
Parameter zkPepe.updateLiquidityThreshold(uint256).new_amount (contracts/Token.sol#692) is not in mixedCase
Function zkPepe.EnableTrading() (contracts/Token.sol#704-709) is not in mixedCase
Function zkPepe.UpdateZeroBuyTax() (contracts/Token.sol#711-713) is not in mixedCase
Function zkPepe.UpdateZeroSellTax() (contracts/Token.sol#715-717) is not in mixedCase
Function zkPepe.SetBuyTax() (contracts/Token.sol#719-721) is not in mixedCase
Function zkPepe.SetSellTax() (contracts/Token.sol#723-725) is not in mixedCase
Function zkPepe.UpdateTxTax() (contracts/Token.sol#727-730) is not in mixedCase
Parameter zkPepe.updatedDeadline(uint256).deadline (contracts/Token.sol#732) is not in mixedCase
Parameter zkPepe.updateExemptFee(address,bool).address (contracts/Token.sol#748) is not in mixedCase
Variable zkPepe.genesis_block (contracts/Token.sol#445) is not in mixedCase
Constant zkPepe.deadWallet (contracts/Token.sol#451-452) 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#23)" inContext (contracts/Token.sol#17-26)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#redundant-statements
zkPepe.constructor() (contracts/Token.sol#473-492) uses literals with too many digits:
- _tokengeneration(msg.sender,420690000000000 * 10 ** decimals()) (contracts/Token.sol#474)
zkPepe.updateLiquidityThreshold(uint256) (contracts/Token.sol#692-702) uses literals with too many digits:
- require(bool,string)(new_amount >= 420690000000,Swap threshold amount should be lower or equal to 0.01% of tokens) (contracts/Token.sol#693-696)
zkPepe.updateLiquidityThreshold(uint256) (contracts/Token.sol#692-702) uses literals with too many digits:
- require(bool,string)(new_amount <= 4206900000000,Swap threshold amount should be lower or equal to 1% of tokens) (contracts/Token.sol#697-700)
zkPepe.slitherConstructorVariables() (contracts/Token.sol#433-775) uses literals with too many digits:
- tokenLiquidityThreshold = 420690000000 * 10 ** 18 (contracts/Token.sol#443)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#too-many-digits
zkPepe.launchtax (contracts/Token.sol#447) should be constant
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-constant
zkPepe.pair (contracts/Token.sol#437) should be immutable
zkPepe.router (contracts/Token.sol#436) should be immutable
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-immutable
```

**Result => A static analysis of contract's source code has been performed using slither,
No major issues were found in the output**



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/0xfd380e0944a236341b86ab506ccbc918c4080d185819633e4cf37188e4fefd72>

2- Buying when excluded (0% tax) (**passed**):

<https://testnet.bscscan.com/tx/0x219248b3bce0128df8d4ba95a1006b7be6098d8d925106c993fc9ba4610e6e8e>

3- Selling when excluded (0% tax) (**passed**):

<https://testnet.bscscan.com/tx/0x2abeeddc5da5463fc969e026a427002aacbbe1b5e7c56f399301c298202cb131>

4- Transferring when excluded from fees (0% tax) (**passed**):

<https://testnet.bscscan.com/tx/0xdf35585bca54e40641979a40898f03fc3fcb145f0783d65101852dbc1c192765>

5- Buying when not excluded from fees (upto 8% tax) (**passed**):

<https://testnet.bscscan.com/tx/0x24bcd482e84c1619eb175e5acccf1c483051c0ae6b440e19da814cd2f04826d1>

6- Selling when not excluded from fees (upto 8% tax) (**passed**):

<https://testnet.bscscan.com/tx/0x4f0eb5b3ecfd7d43ec9648b1ce2efd9b313cb1289df7ca642121f96c77fc9c7c>



FUNCTIONAL TESTING

7- Transferring when not excluded from fees (upto 8% tax)(passed):

<https://testnet.bscscan.com/tx/0x81e26ed066166788902b4cf71aad9ea f598dd93f630f3827eefef82135b80d1a>

7- Internal swap (fee wallets received BNB)(passed):

<https://testnet.bscscan.com/address/0xe590f86e972b4b27ad832d699 b7dd641d9481dbf#internaltx>



MANUAL TESTING

Centralization – Trades must be enabled

Severity: **High**

function: EnableTrading

Status: Resolved (**Contract is owned by Pinksale safu developer**)

Overview:

The smart contract owner must enable trades for holders. If trading remain disabled, no one would be able to buy/sell/transfer tokens.

```
function EnableTrading() external onlyOwner {  
    require(!tradingEnabled, "Cannot re-enable trading");  
    tradingEnabled = true;  
    providingLiquidity = true;  
    genesis_block = block.number;  
}
```

Suggestion

To mitigate this centralization issue, we propose the following options:

1. Renounce Ownership: Consider relinquishing control of the smart contract by renouncing ownership. This would remove the ability for a single entity to manipulate the router, reducing centralization risks.
2. Multi-signature Wallet: Transfer ownership to a multi-signature wallet. This would require multiple approvals for any changes to the mainRouter, adding an additional layer of security and reducing the centralization risk.
3. Transfer ownership to a trusted and valid 3rd party in order to guarantee enabling of the trades (**applied**)



MANUAL TESTING

Informational – Redundant code

Status: Not Resolved

Overview:

Auto-liquidity feature of the contract is never used (0% liquidity tax) hence its suggested to remove auto-liquidity code.



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