



Smart Contract Audit

FOR
PEPACOIN

DATED : 3 May 23'



AUDIT SUMMARY

Project name - PEPACOIN

Date: 3 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	2	0	0	0
Acknowledged	0	0	0	0	0
Resolved	0	0	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/0x434ab6e14b1dee9bd075a94ec8770131213118d0>



Token Information

Token Name : PEPACOIN

Token Symbol: PEPA

Decimals: 18

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

Token Address:

0x98E039F9673F69CeC1CcA175f3458AB3ff9a0751

Checksum:

7b0d6058387825c26af841b8913f24278a52984c

Owner:

0xA2D4D9F2a7C7E9F1997FE56c6F05088fb9a6C6f

(at time of writing the audit)

Deployer:

0xA2D4D9F2a7C7E9F1997FE56c6F05088fb9a6C6f



TOKEN OVERVIEW

Fees:

Buy Fees: up to 20%

Sell Fees: up to 20%

Transfer Fees: 0%

Fees Privilege: Owner

Ownership: Owned

Minting: No mint function

Max Tx Amount/ Max Wallet Amount: Yes

Blacklist: No

Other Privileges: updating fee - updating max tx and wallet



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



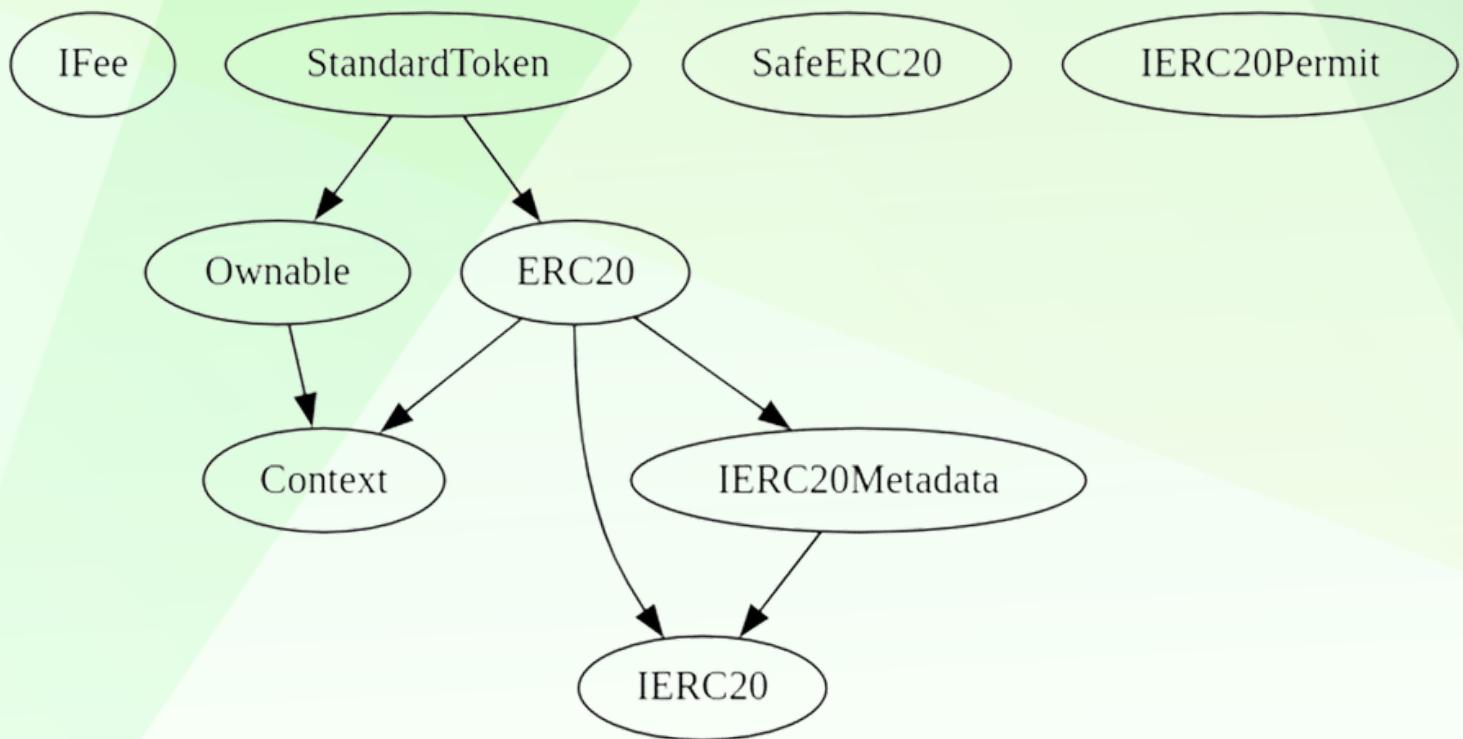
CLASSIFICATION OF RISK

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	2
◆ Medium-Risk	0
◆ Low-Risk	0
◆ Gas Optimization / Suggestions	0

INHERITANCE TREE





POINTS TO NOTE

- Owner is able to set 20% for buy/sell fee separately (40% total)
- Owner is not able to set transfer tax (0% tax)
- Owner is not able to blacklist an arbitrary wallet
- Owner is not able to mint new tokens
- **Owner is able to disable buy/sell/transfers by setting a max transaction and max wallet amounts to a very little number (1 wei)**
- **Owner is able to set a limit for max amount of buy/holding/selling, lowest amount of this limit can be 0.0000000000000001 of PEPA tokens (1 wei)**



CONTRACT ASSESSMENT

Contract	Type	Bases				
L **Function Name** **Visibility** **Mutability** **Modifiers**						
IUniswapV2Router01 Interface						
L factory External ! NO !						
L WETH External ! NO !						
L addLiquidity External ! ● NO !						
L addLiquidityETH External ! \$! NO !						
L removeLiquidity External ! ● NO !						
L removeLiquidityETH External ! ● NO !						
L removeLiquidityWithPermit External ! ● NO !						
L removeLiquidityETHWithPermit External ! ● NO !						
L swapExactTokensForTokens External ! ● NO !						
L swapTokensForExactTokens External ! ● NO !						
L swapExactETHForTokens External ! \$! NO !						
L swapTokensForExactETH External ! ● NO !						
L swapExactTokensForETH External ! ● NO !						
L swapETHForExactTokens External ! \$! NO !						
L quote External ! NO !						
L getAmountOut External ! NO !						
L getAmountIn External ! NO !						
L getAmountsOut External ! NO !						
L getAmountsIn External ! NO !						
IUniswapV2Router02 Interface IUniswapV2Router01						
L removeLiquidityETHSupportingFeeOnTransferTokens External ! ● NO !						
L removeLiquidityETHWithPermitSupportingFeeOnTransferTokens External ! ● NO !						
L swapExactTokensForTokensSupportingFeeOnTransferTokens External ! ● NO !						
L swapExactETHForTokensSupportingFeeOnTransferTokens External ! \$! NO !						
L swapExactTokensForETHSupportingFeeOnTransferTokens External ! ● NO !						
IUniswapV2Pair Interface						
L name External ! NO !						
L symbol External ! NO !						
L decimals External ! NO !						
L totalSupply External ! NO !						
L balanceOf External ! NO !						
L allowance External ! NO !						
L approve External ! ● NO !						
L transfer External ! ● NO !						
L transferFrom External ! ● NO !						
L DOMAIN_SEPARATOR External ! NO !						
L PERMIT_TYPEHASH External ! NO !						

CONTRACT ASSESSMENT

L nonces External ! NO !
L permit External ! ● NO !
L MINIMUM_LIQUIDITY External ! NO !
L factory External ! NO !
L token0 External ! NO !
L token1 External ! NO !
L getReserves External ! NO !
L price0CumulativeLast External ! NO !
L price1CumulativeLast External ! NO !
L kLast External ! NO !
L mint External ! ● NO !
L burn External ! ● NO !
L swap External ! ● NO !
L skim External ! ● NO !
L sync External ! ● NO !
L initialize External ! ● NO !
IUniswapV2Factory Interface
L feeTo External ! NO !
L feeToSetter External ! NO !
L getPair External ! NO !
L allPairs External ! NO !
L allPairsLength External ! NO !
L createPair External ! ● NO !
L setFeeTo External ! ● NO !
L setFeeToSetter External ! ● NO !
L INIT_CODE_PAIR_HASH External ! NO !
IUniswapV2Caller Interface
L swapExactTokensForTokensSupportingFeeOnTransferTokens External ! ● NO !
IFee Interface
L payFee External ! 💸 NO !
StandardToken Implementation ERC20, Ownable
L <Constructor> Public ! 💸 ERC20
L decimals Public ! NO !
L updateUniswapV2Pair External ! ● onlyOwner
L updateUniswapV2Router Public ! ● onlyOwner
L updateLiquidityFee External ! ● onlyOwner
L updateMaxWallet External ! ● onlyOwner
L updateMaxTransactionAmount External ! ● onlyOwner
L updateMarketingFee External ! ● onlyOwner



CONTRACT ASSESSMENT

```
| L | updateMarketingWallet | External ! | ● | onlyOwner | | | |
| L | updateMinAmountToTakeFee | External ! | ● | onlyOwner |
| L | setAutomatedMarketMakerPair | Public ! | ● | onlyOwner |
| L | _setAutomatedMarketMakerPair | Private 🔒 | ● |||
| L | excludeFromFee | External ! | ● | onlyOwner |
| L | excludeFromMaxTransactionAmount | External ! | ● | onlyOwner |
| L | _transfer | Internal 🔒 | ● |||
| L | takeFee | Private 🔒 | ● | lockTheSwap |
| L | swapTokensForBaseToken | Private 🔒 | ● |||
| L | addLiquidity | Private 🔒 | ● |||
| L | <Receive Ether> | 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 | mint | Internal 🔒 | ● |||
| L | _burn | Internal 🔒 | ● |||
| L | _approve | Internal 🔒 | ● |||
| L | _spendAllowance | Internal 🔒 | | ● | |||
| L | _beforeTokenTransfer | Internal 🔒 | | ● | |||
| L | _afterTokenTransfer | 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 |||
```



CONTRACT ASSESSMENT

L name External ! NO !
L symbol External ! NO !
L decimals External ! NO !
Context Implementation
L _msgSender Internal 🔒
L _msgData Internal 🔒
Ownable Implementation Context
L <Constructor> Public ! ● NO !
L owner Public ! NO !
L _checkOwner Internal 🔒
L renounceOwnership Public ! ● onlyOwner
L transferOwnership Public ! ● onlyOwner
L _transferOwnership Internal 🔒 ●
SafeERC20 Library
L safeTransfer Internal 🔒 ●
L safeTransferFrom Internal 🔒 ●
L safeApprove Internal 🔒 ●
L safeIncreaseAllowance Internal 🔒 ●
L safeDecreaseAllowance Internal 🔒 ●
L safePermit Internal 🔒 ●
L _callOptionalReturn Private 🔒 ●
IERC20Permit Interface
L permit External ! ● NO !
L nonces External ! NO !
L DOMAIN_SEPARATOR External ! NO !
Address Library
L isContract Internal 🔒
L sendValue Internal 🔒 ●
L functionCall Internal 🔒 ●
L functionCall Internal 🔒 ●
L functionCallWithValue Internal 🔒 ●
L functionCallWithValue Internal 🔒 ●
L functionStaticCall Internal 🔒
L functionStaticCall Internal 🔒
L functionDelegateCall Internal 🔒 ●
L functionDelegateCall Internal 🔒 ●
L verifyCallResultFromTarget Internal 🔒
L verifyCallResult Internal 🔒



CONTRACT ASSESSMENT

| L | _revert | Private | ||

Help Menu

Symbol	Meaning
	Function can modify state
	Function is payable



STATIC ANALYSIS

```
Address.functionDelegateCall(address,bytes) (contracts/Token.sol#815-825) is never used and should be removed
Address.functionDelegateCall(address,bytes,string) (contracts/Token.sol#833-842) is never used and should be removed
Address.functionStaticCall(address,bytes) (contracts/Token.sol#780-790) is never used and should be removed
Address.functionStaticCall(address,bytes,string) (contracts/Token.sol#798-807) is never used and should be removed
Address.sendValue(address,uint256) (contracts/Token.sol#673-684) is never used and should be removed
Context._msgData() (contracts/Token.sol#134-136) is never used and should be removed
ERC20._burn(address,uint256) (contracts/Token.sol#599-524) is never used and should be removed
SafeERC20.safeApprove(IERC20,address,uint256) (contracts/Token.sol#914-930) is never used and should be removed
SafeERC20.safeDecreaseAllowance(IERC20,address,uint256) (contracts/Token.sol#948-969) is never used and should be removed
SafeERC20.safeIncreaseAllowance(IERC20,address,uint256) (contracts/Token.sol#932-946) is never used and should be removed
SafeERC20.safeTransferFrom(IERC20,address,address,uint256) (contracts/Token.sol#895-905) 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#8) 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#673-684):
- (success) = recipient.call(value: amount)() (contracts/Token.sol#679)
Low level call in Address.functionCallWithValue(address,bytes,uint256,string) (contracts/Token.sol#756-772):
- (success,returndata) = target.call(value: value)(data) (contracts/Token.sol#768-778)
Low level call in Address.functionStaticCall(address,bytes,string) (contracts/Token.sol#798-807):
- (success,returndata) = target.staticcall(data) (contracts/Token.sol#805)
Low level call in Address.functionDelegateCall(address,bytes,string) (contracts/Token.sol#833-842):
- (success,returndata) = target.delegatecall(data) (contracts/Token.sol#840)
Low level call in StandardToken.takeFee() (contracts/Token.sol#1692-1753):
- (success) = address(marketingWallet).call(value: baseTokenForMarketing)() (contracts/Token.sol#1717-1719)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#low-level-calls

Function IUniswapV2Router01.WETH() (contracts/Token.sol#1000) is not in mixedCase
Function IUniswapV2Pair.DOMAIN_SEPARATOR() (contracts/Token.sol#1226) is not in mixedCase
Function IUniswapV2Pair.PERMIT_TYPEHASH() (contracts/Token.sol#1228) is not in mixedCase
Function IUniswapV2Pair.MINIMUM_LIQUIDITY() (contracts/Token.sol#1259) is not in mixedCase
Function IUniswapV2Factory.INIT_CODE_PAIR_HASH() (contracts/Token.sol#1328) is not in mixedCase
Parameter StandardToken.updateUniswapV2Pair(address,_baseTokenForPair) (contracts/Token.sol#1486) is not in mixedCase
Parameter StandardToken.updateLiquidityFee(uint16,uint16,_sellLiquidityFee) (contracts/Token.sol#1518) is not in mixedCase
Parameter StandardToken.updateLiquidityFee(uint16,uint16,_buyLiquidityFee) (contracts/Token.sol#1519) is not in mixedCase
Parameter StandardToken.updateMaxWallet(uint256,_maxWallet) (contracts/Token.sol#1536) is not in mixedCase
Parameter StandardToken.updateMaxTransactionAmount(uint256,_maxTransactionAmount) (contracts/Token.sol#1543) is not in mixedCase
Parameter StandardToken.updateMarketingFee(uint16,uint16,_sellMarketingFee) (contracts/Token.sol#1554) is not in mixedCase
Parameter StandardToken.updateMarketingFee(uint16,uint16,_buyMarketingFee) (contracts/Token.sol#1555) is not in mixedCase
Parameter StandardToken.updateMarketingWallet(address,bool,_marketingWallet) (contracts/Token.sol#1573) is not in mixedCase
Parameter StandardToken.updateMarketingWallet(address,bool,_isMarketingFeeBaseToken) (contracts/Token.sol#1574) is not in mixedCase
Parameter StandardToken.updateMinAmountToTakeFee(uint256,_minAmountToTakeFee) (contracts/Token.sol#1590) is not in mixedCase
Constant StandardToken.uniswapV2Caller (contracts/Token.sol#1347-1348) is not in UPPER CASE WITH underscores
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#conformance-to-solidity-naming-conventions

Variable IUniswapV2Router01.addLiquidity(address,address,uint256,uint256,uint256,uint256,address,uint256).amountDesired (contracts/Token.sol#1005) is too similar to IUniswapV2Router01.addLiquidity(address,address,uint256,uint256,uint256,uint256,address,uint256).amountBDesired (contracts/Token.sol#1006)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#variable-names-too-similar

StandardToken._decimals (contracts/Token.sol#1349) 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/0xa8d9f0588eecc240b9c7fab7b3e1cc599aa1b711abc381903cc43172a1e6739b>

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

<https://testnet.bscscan.com/tx/0x472a220e01da885f1e3dca38835708c76976aafe9e5d7856cf6e544c293a92e9>

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

<https://testnet.bscscan.com/tx/0x8fc1cf3a34fff5e09d702e149abde90696d469e48cb85e998e9235e2bada234>

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

<https://testnet.bscscan.com/tx/0xd30f5283c89c63b898ac743de015a8ea8b7eba82cf54a57ebaa8e7e872e72a78>

5- Buying when not excluded from fees (up to 20% tax) (**passed**):

<https://testnet.bscscan.com/tx/0x494a72970d3255e88153e244f2ccc756af60eec6329a802b42ab55da98b21f72>

6- Selling when not excluded from fees (up to 20% tax) (**passed**):

<https://testnet.bscscan.com/tx/0x5d8f1f884d5fc17ede400b8afa010cb40e20886943b85fc1dab1eff2e9243a16>



FUNCTIONAL TESTING

7- Transferring when not excluded from fees (0% tax) (passed):

<https://testnet.bscscan.com/tx/0x9554362a05942a2cd5af8680480ab3ecafaad02698a8b712d869cc6bc525a9f9>

8- Internal swap (passed):

All fee wallets received BNB + auto liquidity

<https://testnet.bscscan.com/tx/0x5d8f1f884d5fc17ede400b8afa010cb40e20886943b85fc1dab1eff2e9243a16>



MANUAL TESTING

Centralization - Max amount for buy/transfer/wallet/sells

Severity: **High**

Function: updateMaxTransactionAmount - updateMaxWallet

Status: Not Resolved

Overview:

The smart contract allows the owner to set maximum limits for buy, transfer, wallet amounts, and sell transactions. The owner can set these limits to as low as 1 wei (0.0000000000000000000001 PEPA tokens), which could potentially disable buy, transfer, and sell operations for the PEPA token. This high degree of control by the contract owner introduces centralization risks and could impact the token's overall functionality.

```
function updateMaxTransactionAmount(uint256 _maxTransactionAmount) external onlyOwner {  
    require(_maxTransactionAmount > 0, "maxTransactionAmount > 0");  
    emit UpdateMaxTransactionAmount(_maxTransactionAmount, maxTransactionAmount);  
    maxTransactionAmount = _maxTransactionAmount;  
}  
  
function updateMaxWallet(uint256 _maxWallet) external onlyOwner {  
    require(_maxWallet > 0, "maxWallet > 0");  
    emit UpdateMaxWallet(_maxWallet, maxWallet);  
    maxWallet = _maxWallet;  
}
```

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 maximum limits, reducing centralization risks.
2. Multi-signature Wallet: Transfer ownership to a multi-signature wallet. This would require multiple approvals for any changes to the maximum limits, adding an additional layer of security and reducing the centralization risk.



MANUAL TESTING

Logical – Router can be updated to a new address

Severity: **High**

function: updateUniswapV2Pair

Status: not resolved

Overview:

The smart contract allows the owner to update the mainRouter which is the contract that is used to add liquidity for the token during an internal swap. Setting mainRouter to a new contract that has some unknowns issues or doesn't support adding liquidity operations, can cause unknown issues for sells (potentially disabling them)

```
function updateUniswapV2Router(address newAddress) public onlyOwner {  
    require(  
        newAddress != address(mainRouter),  
        "The router already has that address"  
    );  
    emit UpdateUniswapV2Router(newAddress, address(mainRouter));  
    mainRouter = IUniswapV2Router02(newAddress);  
    address _mainPair = IUniswapV2Factory(mainRouter.factory()).createPair(  
        address(this),  
        baseTokenForPair  
    );  
    mainPair = _mainPair;  
    _setAutomatedMarketMakerPair(mainPair, true);  
}
```

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.



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