




# SMART CONTRACT AUDIT

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PREPARED FOR

**PULSINATOR**



## INTRODUCTION

Auditing Firm	InterFi Network
Client Firm	Pulsinator
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
Contract	0x2A80b2739FFBb14831693a8cF519382F25b41137
Blockchain	Binance Smart Chain
Centralization	Active ownership
Commit	0336bf86ad7d7535034c0520811b48472d5d80e4
Website	<a href="https://pulsinator.io/">https://pulsinator.io/</a>
Telegram	<a href="https://t.me/PulsinatorBSC/">https://t.me/PulsinatorBSC/</a>
Twitter	<a href="https://twitter.com/pulsinatorbsc/">https://twitter.com/pulsinatorbsc/</a>
Report Date	August 05, 2023

 Verify the authenticity of this report on our website: <https://www.github.com/interfinetwork>



## EXECUTIVE SUMMARY

InterFi has performed the automated and manual analysis of solidity codes. Solidity codes were reviewed for common contract vulnerabilities and centralized exploits. Here's a quick audit summary:

Status	Critical <span style="color: red;">●</span>	Major <span style="color: orange;">●</span>	Medium <span style="color: yellow;">●</span>	Minor <span style="color: green;">●</span>	Unknown <span style="color: brown;">●</span>
Open	0	1	0	6	2
Acknowledged	1	0	0	3	0
Resolved	0	0	0	0	0
Noteworthy Privileges	<b>Enable Trading, Set Can Transfer Before, Update Fees,</b> Set Max Wallet, Update Payout Token, Airdrop, Multi Send, Toggle Staking, Set Cooldown, Set Limits, Pause Dividends, Set Gas Price Limit, Airdrop and Vest, Airdrop and Team Vest				
enableTrading()	Trading must be enabled by owner to allow EOAs to transfer/trade assets				

**i** Please note that smart contracts deployed on blockchains aren't resistant to exploits, vulnerabilities and/or hacks. Blockchain and cryptography assets utilize new and emerging technologies. These technologies present a high level of ongoing risks. For a detailed understanding of risk severity, source code vulnerability, and audit limitations, kindly review the audit report thoroughly.

**i** Please note that centralization privileges regardless of their inherited risk status - constitute an elevated impact on smart contract safety and security.



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## SCOPE OF WORK

InterFi was consulted by Pulsinator to conduct the smart contract audit of their solidity source codes.

The audit scope of work is strictly limited to mentioned solidity file(s) only:

- PulsinatorBSC.sol

**i** If source codes are not deployed on the main net, they can be modified or altered before main-net deployment. Verify the contract's deployment status below:

Public Contract Link	
<a href="https://bscscan.com/token/0x2A80b2739FFBb14831693a8cF519382F25b41137#code">https://bscscan.com/token/0x2A80b2739FFBb14831693a8cF519382F25b41137#code</a>	
Contract Name	PulsinatorBSC
Compiler Version	0.8.15
License	MIT



# AUDIT METHODOLOGY

Smart contract audits are conducted using a set of standards and procedures. Mutual collaboration is essential to performing an effective smart contract audit. Here's a brief overview of InterFi's auditing process and methodology:

## CONNECT

- The onboarding team gathers source codes, and specifications to make sure we understand the size, and scope of the smart contract audit.

## AUDIT

- Automated analysis is performed to identify common contract vulnerabilities. We may use the following third-party frameworks and dependencies to perform the automated analysis:
  - Remix IDE Developer Tool
  - Open Zeppelin Code Analyzer
  - SWC Vulnerabilities Registry
  - DEX Dependencies, e.g., Pancakeswap, Uniswap
- Simulations are performed to identify centralized exploits causing contract and/or trade locks.
- A manual line-by-line analysis is performed to identify contract issues and centralized privileges.

We may inspect below mentioned common contract vulnerabilities, and centralized exploits:

Centralized Exploits	<ul style="list-style-type: none"><li>○ Token Supply Manipulation</li><li>○ Access Control and Authorization</li><li>○ Assets Manipulation</li><li>○ Ownership Control</li><li>○ Liquidity Access</li><li>○ Stop and Pause Trading</li><li>○ Ownable Library Verification</li></ul>
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Common Contract Vulnerabilities	<ul style="list-style-type: none"><li>○ Integer Overflow</li><li>○ Lack of Arbitrary limits</li><li>○ Incorrect Inheritance Order</li><li>○ Typographical Errors</li><li>○ Requirement Violation</li><li>○ Gas Optimization</li><li>○ Coding Style Violations</li><li>○ Re-entrancy</li><li>○ Third-Party Dependencies</li><li>○ Potential Sandwich Attacks</li><li>○ Irrelevant Codes</li><li>○ Divide before multiply</li><li>○ Conformance to Solidity Naming Guides</li><li>○ Compiler Specific Warnings</li><li>○ Language Specific Warnings</li></ul>
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## REPORT

- The auditing team provides a preliminary report specifying all the checks which have been performed and the findings thereof.
- The client's development team reviews the report and makes amendments to solidity codes.
- The auditing team provides the final comprehensive report with open and unresolved issues.

## PUBLISH

- The client may use the audit report internally or disclose it publicly.

**i** It is important to note that there is no pass or fail in the audit, it is recommended to view the audit as an unbiased assessment of the safety of solidity codes.



## RISK CATEGORIES

Smart contracts are generally designed to hold, approve, and transfer tokens. This makes them very tempting attack targets. A successful external attack may allow the external attacker to directly exploit. A successful centralization-related exploit may allow the privileged role to directly exploit. All risks which are identified in the audit report are categorized here for the reader to review:

Risk Type	Definition
Critical <span style="color: red;">●</span>	These risks could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
Major <span style="color: orange;">●</span>	These risks are hard to exploit but very important to fix, they carry an elevated risk of smart contract manipulation, which can lead to high-risk severity.
Medium <span style="color: yellow;">●</span>	These risks should be fixed, as they carry an inherent risk of future exploits, and hacks which may or may not impact the smart contract execution. Low-risk re-entrancy-related vulnerabilities should be fixed to deter exploits.
Minor <span style="color: green;">●</span>	These risks do not pose a considerable risk to the contract or those who interact with it. They are code-style violations and deviations from standard practices. They should be highlighted and fixed nonetheless.
Unknown <span style="color: brown;">●</span>	These risks pose uncertain severity to the contract or those who interact with it. They should be fixed immediately to mitigate the risk uncertainty.

All statuses which are identified in the audit report are categorized here for the reader to review:

Status Type	Definition
Open	Risks are open.
Acknowledged	Risks are acknowledged, but not fixed.
Resolved	Risks are acknowledged and fixed.





## CENTRALIZED PRIVILEGES

Centralization risk is the most common cause of cryptography asset loss. When a smart contract has a privileged role, the risk related to centralization is elevated.

There are some well-intended reasons have privileged roles, such as:

- Privileged roles can be granted the power to `pause()` the contract in case of an external attack.
- Privileged roles can use functions like, `include()`, and `exclude()` to add or remove wallets from fees, swap checks, and transaction limits. This is useful to run a presale and to list on an exchange.






Authorizing privileged roles to externally-owned-account (EOA) is dangerous. Lately, centralization-related losses are increasing in frequency and magnitude.

- The client can lower centralization-related risks by implementing below mentioned practices:
- Privileged role's private key must be carefully secured to avoid any potential hack.
- Privileged role should be shared by multi-signature (multi-sig) wallets.
- Authorized privilege can be locked in a contract, user voting, or community DAO can be introduced to unlock the privilege.
- Renouncing the contract ownership, and privileged roles.
- Remove functions with elevated centralization risk.

































**i** Understand the project's initial asset distribution. Assets in the liquidity pair should be locked. Assets outside the liquidity pair should be locked with a release schedule.



# AUTOMATED ANALYSIS

Symbol	Definition
	Function modifies state
	Function is payable
	Function is internal
	Function is private
	Function is important

```

| **Context** | Implementation | |||
| L | _msgSender | Internal  | | |
| L | _msgData | Internal  | | |
|||||
| **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  |
| L | nonces | External  | |NO  |
| L | permit | External  |  |NO  |

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| ^ | MINIMUM_LIQUIDITY | External ! | |NO ! |
| ^ | factory | External ! | |NO ! |
| ^ | token0 | External ! | |NO ! |
| ^ | token1 | External ! | |NO ! |
| ^ | getReserves | External ! | |NO ! |
| ^ | price0CumulativeLast | External ! | |NO ! |
| ^ | price1CumulativeLast | External ! | |NO ! |
| ^ | kLast | External ! | |NO ! |
| ^ | mint | External ! | ● |NO ! |
| ^ | burn | External ! | ● |NO ! |
| ^ | swap | External ! | ● |NO ! |
| ^ | skim | External ! | ● |NO ! |
| ^ | sync | External ! | ● |NO ! |
| ^ | initialize | External ! | ● |NO ! |
|||||
| **IUniswapV2Factory** | Interface | |||
| ^ | feeTo | External ! | |NO ! |
| ^ | feeToSetter | External ! | |NO ! |
| ^ | getPair | External ! | |NO ! |
| ^ | allPairs | External ! | |NO ! |
| ^ | allPairsLength | External ! | |NO ! |
| ^ | createPair | External ! | ● |NO ! |
| ^ | setFeeTo | External ! | ● |NO ! |
| ^ | setFeeToSetter | External ! | ● |NO ! |
|||||
| **IERC20** | Interface | |||
| ^ | totalSupply | External ! | |NO ! |
| ^ | balanceOf | External ! | |NO ! |

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| 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 | _mint | Internal 🔒 | ● | |
| L | _burn | Internal 🔒 | ● | |
| L | _approve | Internal 🔒 | ● | |
| L | _beforeTokenTransfer | Internal 🔒 | ● | |

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|||||

| **\*\*DividendPayingTokenOptionalInterface\*\*** | Interface | |||| <sup>L</sup> | withdrawableDividendOf | External ! | |NO! || <sup>L</sup> | withdrawnDividendOf | External ! | |NO! || <sup>L</sup> | accumulativeDividendOf | External ! | |NO! |

|||||

| **\*\*DividendPayingTokenInterface\*\*** | Interface | |||| <sup>L</sup> | dividendOf | External ! | |NO! || <sup>L</sup> | distributeDividends | External ! | 🚫 |NO! || <sup>L</sup> | withdrawDividend | External ! | 🚫 |NO! |

|||||

| **\*\*SafeMath\*\*** | Library | |||| <sup>L</sup> | add | Internal 🔒 | | || <sup>L</sup> | sub | Internal 🔒 | | || <sup>L</sup> | sub | Internal 🔒 | | || <sup>L</sup> | mul | Internal 🔒 | | || <sup>L</sup> | div | Internal 🔒 | | || <sup>L</sup> | div | Internal 🔒 | | || <sup>L</sup> | mod | Internal 🔒 | | || <sup>L</sup> | mod | Internal 🔒 | | |

|||||

| **\*\*Ownable\*\*** | Implementation | Context |||| <sup>L</sup> | <Constructor> | Public ! | 🚫 |NO! || <sup>L</sup> | owner | Public ! | |NO! || <sup>L</sup> | **renounceOwnership** | Public ! | 🚫 | onlyOwner || <sup>L</sup> | **transferOwnership** | Public ! | 🚫 | onlyOwner |

|||||

| **\*\*SafeMathInt\*\*** | Library | |||| <sup>L</sup> | mul | Internal 🔒 | | |

```

|  | div | Internal | | | |
|  | sub | Internal | | |
|  | add | Internal | | |
|  | abs | Internal | | |
|  | toUint256Safe | Internal | | |
|||||
| **SafeMathUint** | Library | | |
|  | toInt256Safe | Internal | | |
|||||
| **IUniswapV2Router01** | Interface | | |
|  | factory | External | | |NO |
|  | WETH | External | | |NO |
|  | addLiquidity | External | | |NO |
|  | addLiquidityETH | External | | |NO |
|  | removeLiquidity | External | | |NO |
|  | removeLiquidityETH | External | | |NO |
|  | removeLiquidityWithPermit | External | | |NO |
|  | removeLiquidityETHWithPermit | External | | |NO |
|  | swapExactTokensForTokens | External | | |NO |
|  | swapTokensForExactTokens | External | | |NO |
|  | swapExactETHForTokens | External | | |NO |
|  | swapTokensForExactETH | External | | |NO |
|  | swapExactTokensForETH | External | | |NO |
|  | swapETHForExactTokens | External | | |NO |
|  | quote | External | | |NO |
|  | getAmountOut | External | | |NO |
|  | getAmountIn | External | | |NO |
|  | getAmountsOut | External | | |NO |

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|  | getAmountsIn | External ! | |NO! |
|||||
| **IUniswapV2Router02** | Interface | IUniswapV2Router01 |||
|  | removeLiquidityETHSupportingFeeOnTransferTokens | External ! | ● |NO! |
|  | removeLiquidityETHWithPermitSupportingFeeOnTransferTokens | External ! | ● |NO! |
|  | swapExactTokensForTokensSupportingFeeOnTransferTokens | External ! | ● |NO! |
|  | swapExactETHForTokensSupportingFeeOnTransferTokens | External ! | 🪙 |NO! |
|  | swapExactTokensForETHSupportingFeeOnTransferTokens | External ! | ● |NO! |
|||||
| **DividendPayingToken** | Implementation | ERC20, DividendPayingTokenInterface,
DividendPayingTokenOptionalInterface |||
|  | <Constructor> | Public ! | ● | ERC20 |
|  | <Receive Ether> | External ! | 🪙 |NO! |
|  | distributeDividends | Public ! | 🪙 |NO! |
|  | withdrawDividend | Public ! | ● |NO! |
|  | _withdrawDividendOfUser | Internal 🔒 | ● | |
|  | dividendOf | Public ! | |NO! |
|  | withdrawableDividendOf | Public ! | |NO! |
|  | withdrawnDividendOf | Public ! | |NO! |
|  | accumulativeDividendOf | Public ! | |NO! |
|  | _transfer | Internal 🔒 | ● | |
|  | _mint | Internal 🔒 | ● | |
|  | _burn | Internal 🔒 | ● | |
|  | _setBalance | Internal 🔒 | ● | |
|||||
| **PulsinatorBSC** | Implementation | ERC20, Ownable |||
|  | <Constructor> | Public ! | ● | ERC20 |
|  | decimals | Public ! | |NO! |

```



L	<Receive Ether>	External !	🚫	NO !
L	updateStakingAmounts	Public !	🚫	onlyOwner
L	enableTrading	External !	🚫	onlyOwner
L	setPresaleWallet	External !	🚫	onlyOwner
L	setMarketingWallet	External !	🚫	onlyOwner
L	setdevWallet	External !	🚫	onlyOwner
L	setExcludeFees	Public !	🚫	onlyOwner
L	setExcludeDividends	Public !	🚫	onlyOwner
L	setIncludeDividends	Public !	🚫	onlyOwner
L	setCanTransferBefore	External !	🚫	onlyOwner
L	setLimitsInEffect	External !	🚫	onlyOwner
L	setGasPriceLimit	External !	🚫	onlyOwner
L	setcooldowntimer	External !	🚫	onlyOwner
L	setmaxWallet	External !	🚫	onlyOwner
L	setmaxTX	External !	🚫	onlyOwner
L	enableStaking	Public !	🚫	onlyOwner
L	stake	Public !	🚫	NO !
L	setSwapTriggerAmount	Public !	🚫	onlyOwner
L	enableSwapAndLiquify	Public !	🚫	onlyOwner
L	setAutomatedMarketMakerPair	Public !	🚫	onlyOwner
L	setAllowCustomTokens	Public !	🚫	onlyOwner
L	setAllowAutoReinvest	Public !	🚫	onlyOwner
L	\_setAutomatedMarketMakerPair	Private 🗝️	🚫	
L	updateGasForProcessing	Public !	🚫	onlyOwner
L	transferAdmin	Public !	🚫	onlyOwner
L	updateTransferFee	Public !	🚫	onlyOwner
L	updateFees	Public !	🚫	onlyOwner

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<sup>L</sup>	`getStakingInfo`	External !		NO!
<sup>L</sup>	`getTotalDividendsDistributed`	External !		NO!
<sup>L</sup>	`isExcludedFromFees`	Public !		NO!
<sup>L</sup>	`withdrawableDividendOf`	Public !		NO!
<sup>L</sup>	`dividendTokenBalanceOf`	Public !		NO!
<sup>L</sup>	`getAccountDividendsInfo`	External !		NO!
<sup>L</sup>	`getAccountDividendsInfoAtIndex`	External !		NO!
<sup>L</sup>	`processDividendTracker`	External !	●	NO!
<sup>L</sup>	`claim`	External !	●	NO!
<sup>L</sup>	`getLastProcessedIndex`	External !		NO!
<sup>L</sup>	`getNumberOfDividendTokenHolders`	External !		NO!
<sup>L</sup>	`setAutoClaim`	External !	●	NO!
<sup>L</sup>	`setReinvest`	External !	●	NO!
<sup>L</sup>	`setDividendsPaused`	External !	●	onlyOwner
<sup>L</sup>	`isExcludedFromAutoClaim`	External !		NO!
<sup>L</sup>	`isReinvest`	External !		NO!
<sup>L</sup>	`_transfer`	Internal 🔒	●	
<sup>L</sup>	`getStakingBalance`	Private 🗝️		
<sup>L</sup>	`swapAndLiquify`	Private 🗝️	●	
<sup>L</sup>	`swapTokensForEth`	Private 🗝️	●	
<sup>L</sup>	`updatePayoutToken`	Public !	●	onlyOwner
<sup>L</sup>	`getPayoutToken`	Public !		NO!
<sup>L</sup>	`setMinimumTokenBalanceForAutoDividends`	Public !	●	onlyOwner
<sup>L</sup>	`setMinimumTokenBalanceForDividends`	Public !	●	onlyOwner
<sup>L</sup>	`addLiquidity`	Private 🗝️	●	
<sup>L</sup>	`forceSwapAndSendDividends`	Public !	●	onlyOwner
<sup>L</sup>	`swapAndSendDividends`	Private 🗝️	●	

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| L | multiSend | Public ! | ● | onlyOwner |
| L | airdropToWallets | External ! | ● | onlyOwner |
| L | airdropAndVest | External ! | ● | onlyOwner |
| L | airdropAndTeamVest | External ! | ● | onlyOwner |
|||||
| **PulsinatorBSCDividendTracker** | Implementation | DividendPayingToken, Ownable |||
| L | <Constructor> | Public ! | ● | DividendPayingToken |
| L | decimals | Public ! | |NO! |
| L | name | Public ! | |NO! |
| L | symbol | Public ! | |NO! |
| L | _transfer | Internal 🔒 | | |
| L | withdrawDividend | Public ! | |NO! |
| L | isExcludedFromAutoClaim | External ! | | onlyOwner |
| L | isReinvest | External ! | | onlyOwner |
| L | setAllowCustomTokens | External ! | ● | onlyOwner |
| L | setAllowAutoReinvest | External ! | ● | onlyOwner |
| L | excludeFromDividends | External ! | ● | onlyOwner |
| L | includeFromDividends | External ! | ● | onlyOwner |
| L | setAutoClaim | External ! | ● | onlyOwner |
| L | setReinvest | External ! | ● | onlyOwner |
| L | setMinimumTokenBalanceForAutoDividends | External ! | ● | onlyOwner |
| L | setMinimumTokenBalanceForDividends | External ! | ● | onlyOwner |
| L | setDividendsPaused | External ! | ● | onlyOwner |
| L | getLastProcessedIndex | External ! | |NO! |
| L | getNumberOfTokenHolders | External ! | |NO! |
| L | getAccount | Public ! | |NO! |
| L | getAccountAtIndex | Public ! | |NO! |
| L | setBalance | External ! | ● | onlyOwner |

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| L | process | Public ! | ● | NO ! |
| L | processAccount | Public ! | ● | onlyOwner |
| L | updateUniswapV2Router | Public ! | ● | onlyOwner |
| L | updatePayoutToken | Public ! | ● | onlyOwner |
| L | getPayoutToken | Public ! | | NO ! |
| L | _reinvestDividendOfUser | Private 🗝️ | ● | |
| L | _withdrawDividendOfUser | Internal 🗝️ | ● | |
|||||
| **IterableMapping** | Library | |||
| L | get | Internal 🗝️ | | |
| L | getIndexOfKey | Internal 🗝️ | | |
| L | getKeyAtIndex | Internal 🗝️ | | |
| L | size | Internal 🗝️ | | |
| L | set | Internal 🗝️ | ● | |
| L | remove | Internal 🗝️ | ● | |

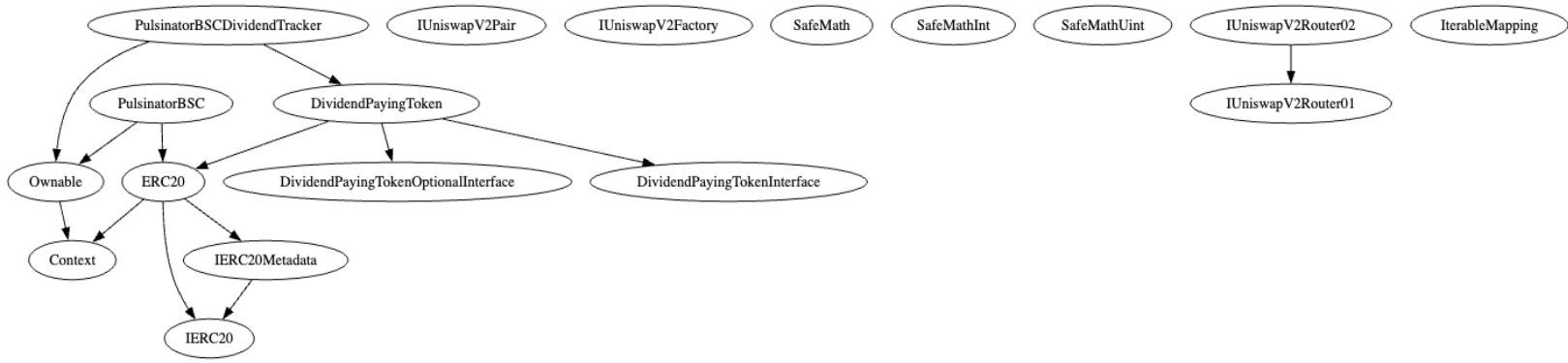
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# INHERITANCE GRAPH



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## MANUAL REVIEW

Identifier	Definition	Severity
CEN-01	Centralized privileges	Critical ●
CEN-06	Privileged role modifies pair	
PUL-01	Trading must be enabled to allow EOAs to transfer/trade assets	

onlyOwner centralized privileges are listed below:

```

transferOwnership()
updateStakingAmounts()
enableTrading()
setPresaleWallet()
setMarketingWallet()
setdevWallet()
setExcludeFees()
setExcludeDividends()
setIncludeDividends()
setCanTransferBefore()
setLimitsInEffect()
setGasPriceLimit()
setcooldowntimer()
setmaxWallet()
setmaxTX()
enableStaking()
setSwapTriggerAmount()
enableSwapAndLiquify()
setAutomatedMarketMakerPair()
setAllowCustomTokens()
setAllowAutoReinvest()
updateGasForProcessing()
transferAdmin()
updateTransferFee()
updateFees()
setDividendsPaused()
updatePayoutToken()

```

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```
setMinimumTokenBalanceForAutoDividends()  
setMinimumTokenBalanceForDividends()  
forceSwapAndSendDividends()  
multiSend()  
airdropToWallets()  
airdropAndVest()  
airdropAndTeamVest()  
isExcludedFromAutoClaim()  
isReinvest()  
setAllowCustomTokens()  
setAllowAutoReinvest()  
excludeFromDividends()  
includeFromDividends()  
setAutoClaim()  
setReinvest()  
setMinimumTokenBalanceForAutoDividends()  
setMinimumTokenBalanceForDividends()  
setDividendsPaused()  
setBalance()  
processAccount()  
updateUniswapV2Router()  
updatePayoutToken()
```

## RECOMMENDATION

Deployers, contract owners, administrators, access controlled, and all other privileged roles' private-keys/access-keys/admin-keys should be secured carefully. These entities can have a single point of failure that compromises the security of the project. Manage centralized and privileged roles carefully, review PAGE 09 for more information.

## ACKNOWLEDGEMENT

Pulsinator team has confirmed that it will recommend users to manage centralized privileges carefully. It is recommended to:



**Implement multi-signature wallets:** Require multiple signatures from different parties to execute certain sensitive functions within contracts. This spreads control and reduces the risk of a single party having complete authority.

**Use a decentralized governance model:** Implement a governance model that enables token holders or other stakeholders to participate in decision-making processes. This can include voting on contract upgrades, parameter changes, or any other critical decisions that impact the contract's functioning.

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Identifier	Definition	Severity
CEN-02	Initial asset distribution	Minor <span style="color: green;">●</span>

All of the initially minted assets are sent to the project owner when deploying the contract. This can be an issue as the project owner can distribute tokens without consulting the community.

```
uint256 totalTokenSupply = (2_000_000) * (10**18);
_mint(owner(), totalTokenSupply); // only time internal mint function is ever called
is to create supply
```

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## RECOMMENDATION

Project must communicate with stakeholders and obtain the community consensus while distributing assets.





Identifier	Definition	Severity
CEN-04	Privileged role receiving LP tokens	Minor <span style="color: green;">●</span>

addLiquidity() sends liquidity to owner()

```
function addLiquidity(uint256 tokenAmount, uint256 ethAmount) private {
    // approve token transfer to cover all possible scenarios
    _approve(address(this), address(uniswapV2Router), tokenAmount);
    // add the liquidity
    uniswapV2Router.addLiquidityETH{value: ethAmount}(
        address(this),
        tokenAmount,
        0, // slippage is unavoidable
        0, // slippage is unavoidable
        owner(),
        block.timestamp
    );
}
```

## RECOMMENDATION

Send LP tokens to dead address or unreachable address.



Identifier	Definition	Severity
LOG-01	Lack of arbitrary limits	Minor ●

Below mentioned functions are set without any arbitrary limits.

```
setSwapTriggerAmount()  
setMinimumTokenBalanceForAutoDividends()  
setMinimumTokenBalanceForDividends()
```

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## RECOMMENDATION

These functions should be provided arbitrary limits, e.g., put a require check that allows maximum tax change up to 25%.



Identifier	Definition	Severity
LOG-02	Potential sandwich attack	Minor <span style="color: green;">●</span>

Potential sandwich attack happens 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 front-running a transaction to purchase assets and make profits by back-running a transaction to sell assets. Below mentioned functions are called without setting restrictions on slippage or minimum output:

```
addLiquidityETH
```

```
swapExactTokensForETHSupportingFeeOnTransferTokens
```

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## RECOMMENDATION

These functions should be provided reasonable minimum output amounts, instead of zero. Read more: <https://coinmarketcap.com/alexandria/article/what-are-sandwich-attacks-in-defi-and-how-can-you-avoid-them>



Identifier	Definition	Severity
LOG-03	Check Effect Interaction	Major 🟡

Below mentioned functions are used without check effect interaction verification:

```
stake()  
processDividendTracker()  
claim()  
setAutoClaim()  
setReinvest()  
withdrawDividend()  
process()
```

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## RECOMMENDATION

Verify check effect interaction for aforementioned functions or introduce re-entrancy guard. It is used to prevent re-entrant calls. Learn about re-entrancy guard: <https://consensys.github.io/smart-contract-best-practices/attacks/reentrancy/>



Identifier	Definition	Severity
COD-01	Authorization through tx.origin	Unknown 🟡

Using tx.origin for authorization could make the contract vulnerable as it refers to the original external account that started the transaction.

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## RECOMMENDATION

Avoid authorizations via global variables wherever necessary.



Identifier	Definition	Severity
COD-02	Timestamp manipulation via <code>block.timestamp</code> Avoid using <code>block.number</code> as timestamp	Minor ●

Be aware that the timestamp of the block can be manipulated by a miner. When the contract uses the timestamp to seed a random number, the miner can actually post a timestamp within 15 seconds of the block being validated, effectively allowing the miner to precompute an option more favorable to their chances.

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## RECOMMENDATION

To maintain block integrity, follow 15 seconds rule, and scale time dependent events accordingly.



Identifier	Definition	Severity
COD-06	Unknown externally owned account	Minor ●

An externally owned account (EOA) has no code, and one can send messages from an externally owned account by creating and signing a transaction.

0xc7E51e4DfA4A039Bd3a3708022509c0D44022e9f

0x1973Aef7dB46330e4187c29082bc327311886030

0xe9e7CEA3DedcA5984780Bafc599bD69ADd087D56

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## RECOMMENDATION

Private keys of externally owned accounts must be secured carefully.



Identifier	Definition
COD-09	Lack of contract balance withdraw

Smart contract may collect tokens, and ethers from external addresses. Some swap, and liquidity-add events may accumulate residual ethers, and tokens.

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## RECOMMENDATION

Add `withdraw()` function to take out tokens and ethers from the contract.





Identifier	Definition	Severity
COD-10	Third Party Dependencies	Unknown ●

Smart contract is interacting with third party protocols e.g., Market Makers, External Contracts, Web 3 Applications, Open Zeppelin tools. The scope of the audit treats third party entities as black boxes and assumes their functional correctness. However, in the real world, third parties can be compromised, and exploited. Moreover, upgrades in third parties can create severe impacts, e.g., increased transactional fees, deprecation of previous routers, etc.

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## RECOMMENDATION

Inspect third party dependencies regularly, and mitigate severe impacts whenever necessary.



Identifier	Definition	Severity
COD-12	Lack of event-driven architecture	Minor ●

Smart contract uses function calls to update state, which can make it difficult to track and analyze changes to the contract over time.

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## RECOMMENDATION

Use events to track state changes. Events improve transparency and provide a more granular view of contract activity.



Identifier	Definition	Severity
VOL-01	Redundant and non-conforming code	Minor <span style="color: green;">●</span>

Redundant code in SafeMath and multiSend.

Use of SafeMath is redundant after compiler 8.0.

multiSend declares redundant uint256 sumOfBalances = 0

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## RECOMMENDATION

Remove redundant code.



Identifier	Definition
COM-01	Floating compiler status

Compiler is set to ^0.8.15.

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## RECOMMENDATION

Pragma should be fixed to the version that you're indenting to deploy your contracts with.



Identifier	Definition	Severity
COM-03	Hardcoded gas amount	Minor <span style="color: green;">●</span>

Gas amount is set to `gasForProcessing = 300000;`

```
function processDividendTracker(uint256 gas) external {
    uint256 iterations,
    uint256 claims,
    uint256 lastProcessedIndex
) = dividendTracker.process(gas);
emit ProcessedDividendTracker(
    iterations,
    claims,
    lastProcessedIndex,
    false,
    gas,
    tx.origin
)
```

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## RECOMMENDATION

Stop the `dividendTracker.process()` call in the `processDividendTracker()`. Users should claim their rewards manually through the function `claim()`.



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## ABOUT INTERFI NETWORK

InterFi Network provides intelligent blockchain solutions. We provide solidity development, testing, and auditing services. We have developed 150+ solidity codes, audited 1000+ smart contracts, and analyzed 500,000+ code lines. We have worked on major public blockchains e.g., Ethereum, Binance, Cronos, Doge, Polygon, Avalanche, Metis, Fantom, Bitcoin Cash, Velas, Oasis, etc.

InterFi Network is built by engineers, developers, UI experts, and blockchain enthusiasts. Our team currently consists of 4 core members, and 6+ casual contributors.

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