

SMART CONTRACT AUDIT

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PREPARED FOR

BUSD TOTAL REWARDS



INTRODUCTION

Auditing Firm	InterFi Network
Client Firm	BUSD Total Rewards
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
Contract	0xc2d2AFF225ca94eb11656Aa69e8C93F8F001A4dE
Blockchain	Binance Smart Chain
Centralization	Active ownership
Commit F INT	17c6eff183d5b3390abdbea5e19cb5142052aec7 INTERF INTERF
Website	https://busdv2.com/
Telegram	https://t.me/busdv2/
Twitter	https://www.twitter.com/busdv2/
Instagram	https://www.instagram.com/busdv2/
Prelim Report Date	November 06, 2022
Final Report Date	November 19, 2022

I Verify the authenticity of this report on our website: https://www.interfi.network/audits

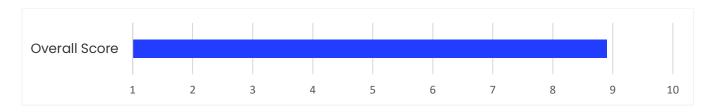


EXECUTIVE SUMMARY

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

Status	Critical	Major 🛑	Medium 🖯	Minor	Unknown
Open	0	0	0	3	1
Acknowledged	0	0	1	2	0
Resolved	0	0	0	0	0
Noteworthy only0wner Privileges Set Taxes and Ratios, Airdrop, Set Protection Settings, Set Reward Properties, Set Reflector Settings, Set Swap Settings, Set Pair and Router					

BUSD Total Rewards's smart contract has achieved the following score: 8.9



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.

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 BUSD Total Rewards to conduct the smart contract audit of its solidity source code. The audit scope of work is strictly limited to mentioned solidity file only:

- o BUSDTotalRewards.sol
- External contracts and/or interfaces dependencies are not checked due to being out of scope.

 Verify audited contract's contract address and deployed link below:

Public Contract Link			
https://bscscan.com/address/0xc2d2AFF225ca94eb11656Aa69e8C93F8F001A4dE#code			
Contract Name	BUSDTotalRewards REPORT		
Compiler Version	0.8.17		
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:

	o Token Supply Manipulation
	o Access Control and Authorization
	 Assets Manipulation
Controlized Evaluita	o Ownership Control
Centralized Exploits	o Liquidity Access
	 Stop and Pause Trading
	 Ownable Library Verification



	0	Integer Overflow
	0	Lack of Arbitrary limits
	0	Incorrect Inheritance Order
	0	Typographical Errors
	0	Requirement Violation
	0	Gas Optimization
	0	Coding Style Violations
Common Contract Vulnerabilities	0	Re-entrancy
	0	Third-Party Dependencies
	0	Potential Sandwich Attacks
	0	Irrelevant Codes
	0	Divide before multiply
	ORFI INT	Conformance to Solidity Naming Guides Compiler Specific Warnings
	0	Language Specific Warnings

REPORT

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

PUBLISH

- o The client may use the audit report internally or disclose it publicly.
- 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 •	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	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 O	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 reentrancy-related vulnerabilities should be fixed to deter exploits. These risks do not pose a considerable risk to the contract or those who interact
Minor •	with it. They are code-style violations and deviations from standard practices. They should be highlighted and fixed nonetheless.
Unknown	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:

- o 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.

- o The client can lower centralization-related risks by implementing below mentioned practices:
- o 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.
- o Remove functions with elevated centralization risk.
- 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
es a	Function is payable
	Function is internal
	Function is private
Ţ	Function is important

```
| **IERC20** | Interface | |||
| L | totalSupply | External ! | NO! |
| L | decimals | External ! | NO! |
| L | symbol | External ! | NO! |
| L | name | External ! | | NO! |
[ ] getOwner | External | NO! | CONFIDENTIAL
| L | balanceOf | External ! | NO! | |
| L | transfer | External ! | G | NO! |
| L | allowance | External ! | NO! |
| L | approve | External ! | ● |NO! |
| L | transferFrom | External ! | 🔎 |NO! |
| **IFactoryV2** | Interface | |||
| L | getPair | External ! | NO! |
| └ | createPair | External ! | ● |NO! |
\Pi\Pi\Pi\Pi
| **IV2Pair** | Interface | ||| | |
| L | factory | External ! | NO! |
| L | getReserves | External ! | NO! |
| L | sync | External ! | 🔴 |NO! |
| | | | | | | |
```



```
| **IRouter01** | Interface | |||
| L | factory | External ! | NO! |
| L | WETH | External ! | NO! |
| L | addLiquidityETH | External ! | 💹 |NO! |
| └ | addLiquidity | External ! | ● |NO! |
| L | swapExactETHForTokens | External ! | 🐸 |NO! |
| L | getAmountsOut | External ! | NO! |
| L | getAmountsIn | External ! | NO! |
\Pi\Pi\Pi\Pi
| **IRouter02** | Interface | IRouter01 |||
| L | swapExactTokensForETHSupportingFeeOnTransferTokens | External ! | 🛑 | NO! |
| L | swapExactETHForTokensSupportingFeeOnTransferTokens | External ! | 💹 |NO! |
| L | swapExactTokensForTokensSupportingFeeOnTransferTokens | External ! | 🛑 |NO! |
| └ | swapExactTokensForTokens | External ! | ● |NO! |
\Pi\Pi\Pi\Pi
| **Protections** | Interface | |||
| └ | checkUser | External ! | ● |NO! |
| L | setLaunch | External ! | 🔴 |NO! |
| L | setLpPair | External ! | ● |NO! |
| L | setProtections | External ! | ● |NO! |
| L | removeSniper | External ! | P | NO! |
\Pi\Pi\Pi\Pi
| **Cashier** | Interface | |||
| └ | setRewardsProperties | External ! | ● |NO! |
| L | tally | External ! | 🛑 |NO! |
| L | load | External ! | 🐸 |NO! |
| L | cashout | External ! | 🔎 |NO! |
| L | giveMeWelfarePlease | External ! | • | NO! |
| L | getTotalDistributed | External ! | NO! |
| L | getUserInfo | External ! | NO! |
| L | getUserRealizedRewards | External ! |
| L | getPendingRewards | External ! | NO! |
```



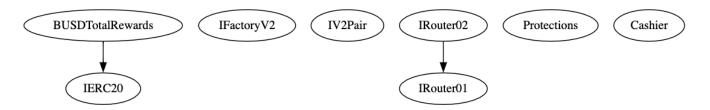
```
| L | initialize | External ! | 🔴 |NO! |
| L | getCurrentReward | External ! | NO! |
| **BUSDTotalRewards** | Implementation | IERC20 |||
| L | <Constructor> | Public ! | MO! |
| L | transferOwner | External ! | 🔴 | onlyOwner |
| └ | renounceOwnership | External ! | ● | onlyOwner |
| L | <Receive Ether> | External ! | 💹 |NO! |
| L | totalSupply | External ! | NO! |
| L | decimals | External ! | NO! |
| L | symbol | External ! | NO! |
| L | name | External ! | NO! |
| L | getOwner | External ! | NO! |
| L | balanceOf | Public ! | NO! |
| L | allowance | External ! | NO! |
| L | approve | External ! | 🔎 |NO! |
| L | _approve | Internal 🗎 | 🛑 | |
| L | approveContractContingency | Public ! | OnlyOwner |
| L | transfer | External ! | 🛑 |NO! |
| L | transferFrom | External ! | • |NO! |
| L | setNewRouter | External ! | • | onlyOwner |
| L | setLpPair | External ! | 🔴 | onlyOwner |
| L | setInitializers | External ! | G | onlyOwner |
| L | isExcludedFromFees | External ! | NO! |
| L | isExcludedFromDividends | External ! | NO! |
| L | isExcludedFromProtection | External ! | NO! |
| L | setDividendExcluded | Public ! | 🔴 | onlyOwner |
| L | setExcludedFromFees | Public ! | OnlyOwner |
| L | setExcludedFromProtection | External ! | OnlyOwner |
| L | removeSniper | External ! | OnlyOwner |
| L | setProtectionSettings | External ! | OnlyOwner |
```



```
| └ | setWallets | External ! | ● | onlyOwner |
| └ | lockTaxes | External ! | ● | onlyOwner |
| └ | setTaxes | External ! | ● | onlyOwner |
| L | setRatios | External ! | OnlyOwner |
| L | getTokenAmountAtPriceImpact | External ! |
| └ | setSwapSettings | External ! | ● | onlyOwner |
| └ | setPriceImpactSwapAmount | External ! | ● | onlyOwner |
| └ | setContractSwapEnabled | External ! | ● | onlyOwner |
| └ | setRewardsProperties | External ! | ● | onlyOwner |
| L | setReflectorSettings | External ! | • | onlyOwner |
| └ | excludePresaleAddresses | External ! | ● | onlyOwner |
| └ | _basicTransfer | Internal 🔒 | 🔎 | |
| L | contractSwap | Internal 🗎 | 🔎 | inSwapFlag |
| <sup>L</sup> | _checkLiquidityAdd | Private 🔐 | 🛑 | |
| L | enableTrading | Public ! | 🔴 | onlyOwner |
| └ | finalizeTransfer | Internal 🗎 | 🛑 | |
| └ | processRewards | Internal 🏺 | ● | |
| L | manualProcess | External ! | P | NO! |
| L | multiSendTokens | External ! | 📦 | onlyOwner |
| L | manualDeposit | External ! | 🐸 |NO! |
| L | sweepContingency | External ! | Page | onlyOwner |
| └ | sweepExternalTokens | External ! | ● | onlyOwner |
| └ | claimPendingRewards | External ! | ● |NO! |
| L | getTotalReflected | External ! | NO! |
| L | getUserInfo | External ! | NO! |
| L | getUserRealizedGains | External ! |
                                        |N0 ! |
| L | getUserUnpaidEarnings | External ! |
| L | getCurrentReward | External ! | NO! |
```



INHERITANCE GRAPH



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MANUAL REVIEW

Identifier	Definition	Severity
CEN-01	Centralization privileges of BUSD Total Rewards	Medium 🔵

only0wner privileges are listed below:

transferOwner
renounceOwnership
approveContractContingency
setNewRouter
setLpPair
setInitializers
setDividendExcluded
setExcludedFromFees
setExcludedFromProtection
removeSniper
setProtectionSettings

setWallets

lockTaxes

setTaxes

setRatios

setSwapSettings

 ${\tt setPriceImpactSwapAmount}$

setContractSwapEnabled

 ${\tt setRewardsProperties}$

setReflectorSettings

excludePresaleAddresses

enableTrading

multiSendTokens

sweepContingency

 ${\tt sweepExternalTokens}$





RECOMMENDATION

Deployer and/or contract owner private keys are secured carefully. Please refer to PAGE-09 CENTRALIZED PRIVILEGES for a detailed understanding.

ALLEVIATION

BUSD Total Rewards project team understands the centralization risk. Some functions are provided privileged access to ensure a good runtime behaviour in the project





Identifier	Definition	Severity
CEN-02	Initial asset distribution	Minor •

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

```
uint256 constant private _tTotal = startingSupply * (10 ** _decimals);
   _t0wned[_owner] = _tTotal;
emit Transfer(ZERO, _owner, _tTotal);
```

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RECOMMENDATION

Project stakeholders should be consulted during the initial asset distribution process.



Identifier	Definition	Severity
LOG-01	Arbitrary limits are set	

Below mentioned functions are set with arbitrary limits.

setTaxes
setRatios
setSwapSettings
setPriceImpactSwapAmount
setReflectorSettings





Identifier	Definition	Severity
COD-01	Authorization through tx.origin Missing dependencies	Unknown •

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

Line 521

Following interface dependencies are used in this contract:

```
interface Protections {
interface Cashier {
```

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RECOMMENDATION

Avoid authorizations via global variables wherever necessary. Include missing dependencies in the code.



Identifier	Definition	Severity
COD-02	Timestamp manipulation via block.timestamp Avoid using block.number 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, this is a critical exploit for contracts calculating random numbers, e.g., lottery.

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RECOMMENDATION

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



Identifier	Definition	Severity
COD-10	Third Party Dependencies	Minor •

Smart contract is interacting with third party protocols e.g., Uniswap router, cashier contract, protections contract. 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 and validate third party dependencies regularly, and mitigate severe impacts whenever necessary.



Identifier	Definition	Severity
COD-14	Use Open Zeppelin ideal ERC20 implementation	Minor •

Smart contract should use Open Zeppelin ERC20 implementation as it includes increaseApproval and decreaseApproval.

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RECOMMENDATION

Refer to https://github.com/ethereum/EIPs/issues/20#issuecomment-263524729 to get information regarding a known approval related issue.



Identifier	Definition	Severity
COM-02	Irrelevant code	

IV2Pair is declared, but not used.





RECOMMENDATION

Remove unused code.



Identifier	Definition	Severity
COM-04	Potential resource exhaustion errors External call inside a loop	Minor •

```
function multiSendTokens(address[] memory accounts, uint256[] memory amounts) external
onlyOwner {
    require(accounts.length == amounts.length, "Lengths do not match.");
    for (uint16 i = 0; i < accounts.length; i++) {</pre>
```

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RECOMMENDATION

Set an upper limit for multi-address calls, e.g., 100 wallets can be airdropped in a single transaction.

Use the pull-over-push strategy for external calls.



DISCLAIMERS

InterFi Network provides the easy-to-understand audit of solidity source codes (commonly known as smart contracts).

The smart contract for this particular audit was analyzed for common contract vulnerabilities, and centralization exploits. This audit report makes no statements or warranties on the security of the code. This audit report does not provide any warranty or guarantee regarding the absolute bug-free nature of the smart contract analyzed, nor do they provide any indication of the client's business, business model or legal compliance. This audit report does not extend to the compiler layer, any other areas beyond the programming language, or other programming aspects that could present security risks. Cryptographic tokens are emergent technologies, they carry high levels of technical risks and uncertainty. You agree that your access and/or use, including but not limited to any services, reports, and materials, will be at your sole risk on an as-is, where-is, and as-available basis. This audit report could include false positives, false negatives, and other unpredictable results.

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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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SMART CONTRACT AUDITS | SOLIDITY DEVELOPMENT AND TESTING RELENTLESSLY SECURING PUBLIC AND PRIVATE BLOCKCHAINS