



SMART CONTRACT AUDIT

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PREPARED FOR

AMERICIUM



INTRODUCTION

| | |
|----------------|---|
| Auditing Firm | InterFi Network |
| Client Firm | Americium |
| Methodology | Automated Analysis, Manual Code Review |
| Language | Solidity |
| | |
| Contract | 0x438131Fd53742252dfAaef04Ee8D4779a93abFfa |
| Blockchain | Binance Smart Chain |
| Centralization | Active ownership |
| Commit | 5e6d19ec03be8bdbbe6453cdee27934ea7815a67f |
| | |
| Website | https://americium.io/ |
| Twitter | https://twitter.com/americiumbsc/ |
| Facebook | https://www.facebook.com/AmericiumTokens/ |
| Medium | https://medium.com/@americiumofficial/ |
| Report Date | December 07, 2022 |

 Verify the authenticity of this report on our website: <https://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 ● | Major ● | Medium ● | Minor ● | Unknown ● |
|---------------------------------|---|---|--|--|--|
| Open | 0 | 1 | 0 | 5 | 1 |
| Acknowledged | 0 | 1 | 1 | 5 | 0 |
| Resolved | 0 | 0 | 0 | 0 | 0 |
| Noteworthy onlyOwner Privileges | Set Can Transfer Before, Set Whitelist for Public Trade, Airdrop to Wallets, Set Pair, Set Trading, Set Cooldown, Set Max Wallet, Set Fees, Transfer Admin, Pause Dividends, Update Payout Token, Set Truedefi Router | | | | |

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 Americium 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:

- Americium.sol

 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 | |
| https://bscscan.com/address/0x438131fd53742252dfaaef04ee8d4779a93abffa#code | |
| | |
| Contract Name | Americium |
| 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:

| | |
|----------------------|---|
| Centralized Exploits | <ul style="list-style-type: none">○ Token Supply Manipulation○ Access Control and Authorization○ Assets Manipulation○ Ownership Control○ Liquidity Access○ Stop and Pause Trading○ Ownable Library Verification |
|----------------------|---|



| | |
|---------------------------------|---|
| Common Contract Vulnerabilities | <ul style="list-style-type: none"> ○ Integer Overflow ○ Lack of Arbitrary limits ○ Incorrect Inheritance Order ○ Typographical Errors ○ Requirement Violation ○ Gas Optimization ○ Coding Style Violations ○ Re-entrancy ○ Third-Party Dependencies ○ Potential Sandwich Attacks ○ Irrelevant Codes ○ Divide before multiply ○ Conformance to Solidity Naming Guides ○ Compiler Specific Warnings ○ Language Specific Warnings |
|---------------------------------|---|

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.

 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  | 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  | 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  | 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.





































 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  |
|  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! |

```

```

|||||

```

```

| **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 | _mint | Internal 🔒 | 🚫 | |
| L | _burn | Internal 🔒 | 🚫 | |
| L | _approve | Internal 🔒 | 🚫 | |
| L | _beforeTokenTransfer | Internal 🔒 | 🚫 | |
|||||
| **DividendPayingTokenOptionalInterface** | Interface | |||
| L | withdrawableDividendOf | External ! | |NO ! |
| L | withdrawnDividendOf | External ! | |NO ! |
| L | accumulativeDividendOf | External ! | |NO ! |
|||||
| **DividendPayingTokenInterface** | Interface | |||
| L | dividendOf | External ! | |NO ! |
| L | distributeDividends | External ! | 🚫 |NO ! |
| L | withdrawDividend | External ! | 🚫 |NO ! |

```








|||||

| ****SafeMath**** | Library | |||| ^L | add | Internal  | | || ^L | sub | Internal  | | || ^L | sub | Internal  | | || ^L | mul | Internal  | | || ^L | div | Internal  | | || ^L | div | Internal  | | || ^L | mod | Internal  | | || ^L | mod | Internal  | | |

|||||

| ****Ownable**** | Implementation | Context |||| ^L | <Constructor> | Public ! |  | NO ! || ^L | owner | Public ! | | NO ! || ^L | renounceOwnership | Public ! |  | onlyOwner || ^L | transferOwnership | Public ! |  | onlyOwner |

|||||

| ****SafeMathInt**** | Library | |||| ^L | mul | Internal  | | || ^L | div | Internal  | | || ^L | sub | Internal  | | || ^L | add | Internal  | | || ^L | abs | Internal  | | || ^L | toUint256Safe | Internal  | | |

|||||

| ****SafeMathUint**** | Library | |||| ^L | toInt256Safe | Internal  | | |

|||||

| ****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! |
|||||
| **DividendPayingToken** | Implementation | ERC20, DividendPayingTokenInterface,
DividendPayingTokenOptionalInterface |||
| L | <Constructor> | Public ! | 🚫 | ERC20 |
| L | <Receive Ether> | External ! | 🚫 |NO! |
| L | distributeDividends | Public ! | 🚫 |NO! |
| L | withdrawDividend | Public ! | 🚫 |NO! |
| L | _withdrawDividendOfUser | Internal 🚫 | 🚫 | |
| L | dividendOf | Public ! | |NO! |

```



```

|  | withdrawableDividendOf | Public ! | |NO! |
|  | withdrawnDividendOf | Public ! | |NO! |
|  | accumulativeDividendOf | Public ! | |NO! |
|  | _transfer | Internal | | |
|  | _mint | Internal | | |
|  | _burn | Internal | | |
|  | _setBalance | Internal | | |
|||||
| **ITrueDefiSwap** | Interface | |||
|  | triggeredTokenSent | External ! | |NO! |
|||||
| **Americium** | Implementation | ERC20, Ownable |||
|  | <Constructor> | Public ! | |ERC20 |
|  | decimals | Public ! | |NO! |
|  | <Receive Ether> | External ! | |NO! |
|  | updateStakingAmounts | Public ! | |onlyOwner |
|  | isTrading | Internal | | |
|  | setWhitelistForPublicTrade | External ! | |onlyOwner |
|  | setPublicTrading | External ! | |onlyOwner |
|  | setTrueDefiRouter | External ! | |onlyOwner |
|  | setPresaleWallet | External ! | |onlyOwner |
|  | setMarketingWallet | External ! | |onlyOwner |
|  | setBuyBackWallet | External ! | |onlyOwner |
|  | setDevWallet | External ! | |onlyOwner |
|  | setExcludeFees | Public ! | |onlyOwner |
|  | setExcludeDividends | Public ! | |onlyOwner |
|  | setIncludeDividends | Public ! | |onlyOwner |
|  | setCanTransferBefore | External ! | |onlyOwner |
|  | setLimitsInEffect | External ! | |onlyOwner |
|  | setGasPriceLimit | External ! | |onlyOwner |
|  | setcooldowntimer | External ! | |onlyOwner |

```



| | | | | | | | | |
|---|---------------------------------|----------|---|--|---|--|-----------|--|
| L | setMaxWallet | 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 | |
| L | getStakingInfo | External | ! | | | | NO! | |
| L | getTotalDividendsDistributed | External | ! | | | | NO! | |
| L | isExcludedFromFees | Public | ! | | | | NO! | |
| L | withdrawableDividendOf | Public | ! | | | | NO! | |
| L | dividendTokenBalanceOf | Public | ! | | | | NO! | |
| L | getAccountDividendsInfo | External | ! | | | | NO! | |
| L | getAccountDividendsInfoAtIndex | External | ! | | | | NO! | |
| L | processDividendTracker | External | ! | | 🔴 | | NO! | |
| L | claim | External | ! | | 🔴 | | NO! | |
| L | getLastProcessedIndex | External | ! | | | | NO! | |
| L | getNumberOfDividendTokenHolders | External | ! | | | | NO! | |
| L | setAutoClaim | External | ! | | 🔴 | | NO! | |
| L | setReinvest | External | ! | | 🔴 | | NO! | |
| L | setDividendsPaused | External | ! | | 🔴 | | onlyOwner | |
| L | isExcludedFromAutoClaim | External | ! | | | | NO! | |
| L | isReinvest | External | ! | | | | NO! | |
| L | _transfer | Internal | 🔒 | | 🔴 | | | |
| L | getStakingBalance | Private | 🔒 | | | | | |




```

| L | swapAndLiquify | Private 🗝️ | 🔴 | |
| L | swapTokensForEth | Private 🗝️ | 🔴 | |
| L | updatePayoutToken | Public ! | 🔴 | onlyOwner |
| L | getPayoutToken | Public ! | | NO ! |
| L | setMinimumTokenBalanceForAutoDividends | Public ! | 🔴 | onlyOwner |
| L | setMinimumTokenBalanceForDividends | Public ! | 🔴 | onlyOwner |
| L | addLiquidity | Private 🗝️ | 🔴 | |
| L | forceSwapAndSendDividends | Public ! | 🔴 | onlyOwner |
| L | swapAndSendDividends | Private 🗝️ | 🔴 | |
| L | airdropToWallets | External ! | 🔴 | onlyOwner |
|||||
| **AmericiumDividendTracker** | 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 ! |

```



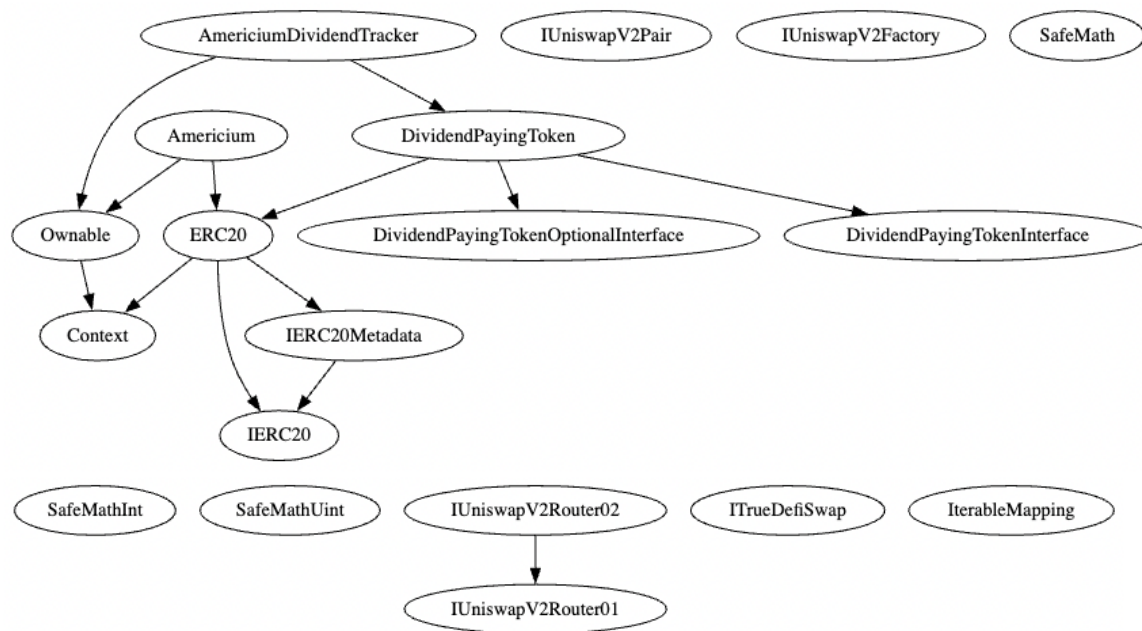
```

|  L | getAccount | Public ! |  | NO ! |
|  L | getAccountAtIndex | Public ! |  | NO ! |
|  L | setBalance | External ! |  | onlyOwner |
|  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 |  |  |

```



INHERITANCE GRAPH



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CONFIDENTIAL AUDIT REPORT CONFIDENTIAL AUDIT REPORT CONFIDENTIAL AUDIT REPORT CONFIDENTIAL AUDIT REPORT CONFIDENTIAL AUDIT REPORT CONFIDENTIAL AUDIT REPORT CONFIDENTIAL AUDIT REPORT



MANUAL REVIEW

| Identifier | Definition | Severity |
|------------|--|----------|
| CEN-01 | Centralization privileges of Americium | Major 🟡 |

onlyOwner Centralized privileges are listed below:

```

transferOwnership()
updateStakingAmounts()
setWhitelistForPublicTrade()
setPublicTrading()
setTrueDefiRouter()
setPresaleWallet()
setMarketingWallet()
setBuyBackWallet()
setDevWallet()
setExcludeFees()
setExcludeDividends()
setIncludeDividends()
setCanTransferBefore()
setLimitsInEffect()
setGasPriceLimit()
setcooldowntimer()
setmaxWallet()
enableStaking()
setSwapTriggerAmount()
enableSwapAndLiquify()
setAutomatedMarketMakerPair()
setAllowCustomTokens()
setAllowAutoReinvest()
updateGasForProcessing()
transferAdmin()
updateTransferFee()
updateFees()
setDividendsPaused()
updatePayoutToken()
forceSwapAndSendDividends()
airdropToWallets()

```




```
isExcludedFromAutoClaim()  
setAllowCustomTokens()  
setAllowAutoReinvest()  
excludeFromDividends()  
includeFromDividends()  
setAutoClaim()  
setReinvest()  
setDividendsPaused()  
setBalance()  
processAccount()  
updateUniswapV2Router()
```

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RECOMMENDATION

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



| 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 totalTokenSupply = (10_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-03 | Privileged role allowing transfer before enable trade and whitelisting wallets for trade | Major 🟡 |

Privileged role can call `setCanTransferBefore()` and `setWhitelistForPublicTrade()`

```
function setCanTransferBefore(address wallet, bool enable)
    external
    onlyOwner
{
    canTransferBeforeTradingIsEnabled[wallet] = enable;
}


function setWhitelistForPublicTrade(address _addr, bool _flag) external onlyOwner {
    whitelistForPublicTrade[_addr] = _flag;
}
```

RECOMMENDATION

Remove `setCanTransferBefore()` – as it can only allow whitelisted wallets to transfer assets. No one except contract owner should transfer assets before `enableTrading()`.

Remove `setWhitelistForPublicTrade()` – as it can only allow whitelisted wallets to transfer assets.



| Identifier | Definition | Severity |
|------------|-------------------------------------|---|
| CEN-04 | Privileged role receiving LP tokens | Minor  |

Smart contract function 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
    );
}
```

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RECOMMENDATION

Send LP tokens to dead address or unreachable address.



| Identifier | Definition | Severity |
|------------|-----------------------------------|----------|
| CEN-05 | Privileged role pausing dividends | |


Privileged role can call setDividendsPaused()

```
function setDividendsPaused(bool value) external onlyOwner {
    require(dividendsPaused != value);
    dividendsPaused = value;
    emit DividendsPaused(value);
}
```

RECOMMENDATION

Pause dividends intentionally stops rewards distribution.



| Identifier | Definition | Severity |
|------------|---|---|
| CEN-06 | Privileged role modifying pair and router | Minor  |

Privileged role can call setAutomatedMarketPair()

```
function setAutomatedMarketMakerPair(address pair, bool value)
    public
    onlyOwner
{
    _setAutomatedMarketMakerPair(pair, value);
}
```

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RECOMMENDATION

The current trading pair, e.g., Pancakeswap or Uniswap pair should not be removed from automated market makers.



| Identifier | Definition | Severity |
|------------|--------------------------|----------|
| LOG-01 | Lack of arbitrary limits | |

Below mentioned functions are set without any arbitrary limits.


```
setSwapTriggerAmount()
```

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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  |

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:

```
swapTokensForEth()
```

```
addLiquidity()
```

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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 | Re-entrancy | Unknown 🟠 |

Below mentioned functions are used without re-entrancy guard:

stake()

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RECOMMENDATION

Re-entrancy guard 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 |
|------------|-------------------------|----------|
| LOG-04 | Use of novel tefiRouter | Medium 🟡 |


Smart contract owner can change true defi router. The contract is serving as the underlying entity to interact with third party true defi protocols. The scope of the audit treats 3rd party entities as black boxes and assume their functional correctness. However, in the real world, 3rd parties can be compromised and this may lead to lost or stolen assets. In addition, upgrades of 3rd parties can possibly create severe impacts, such as increasing fees of 3rd parties, migrating to new LP pools, etc.

```
function setTrueDefiRouter(address _router) external onlyOwner {
    tefiRouter = _router;
    if (_router != address(0)) {
        whitelistForPublicTrade[_router] = true;
        _isExcludedFromFees[_router] = true;
        dividendTracker.excludeFromDividends(_router);
    }
    launchblock = block.number;
    tradingEnabled = true;
    emit TradingEnabled();
}
```

RECOMMENDATION

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



| Identifier | Definition | Severity |
|------------|------------------------------|---|
| LOG-05 | Access control via interface | Minor  |

In smart contract, external function in ITrueDefiSwap should be checked for adequate access control:


```
function triggeredTokenSent(uint256, address) external;
```

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RECOMMENDATION

To specify access control, fix input and msg.sender requirements when using interface.



| Identifier | Definition | Severity |
|------------|---------------------------------|---|
| COD-01 | Authorization through tx.origin | Minor  |


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, 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-04 | Missing error messages | |

require statements should be provided a description for input errors.

RECOMMENDATION

Provide information strings for **require** related errors.




| Identifier | Definition | Severity |
|------------|---------------------------------|----------|
| COD-05 | Missing zero address validation | |

Address inputs must be validated for zero address check, e.g., `setMarketingWallet()`

RECOMMENDATION

Validate if the modified address is dead(`0`) or not.



| 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.

```
marketingWallet = payable(0x8aaEb8E7BEedf624b8FE36b97EF98B18F9D7398);  
devWallet = payable(0x2384a04204c2a96b9aeff1F98e66f509824B5778);  
buybackWallet = payable(0x061188E7c73259A7670AfE87CE2D93A53fe33af9);
```

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RECOMMENDATION

Private keys of externally owned accounts must be secured carefully.



| Identifier | Definition | Severity |
|------------|-----------------------------------|----------|
| COD-09 | Missing 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-11 | Improper use of external and/or public attributes | |

Use external instead of public wherever possible to optimize transactional gas use.

RECOMMENDATION

To maintain logic integrity and gas optimization, use proper visibility attributes.



| Identifier | Definition | Severity |
|------------|---|---|
| VOL-06 | Volatile and redundant code in transferOwnership() and SafeMath | Minor  |

Multiple instances of transferOwnership() function found in the contract. SafeMath is not needed after compiler version 0.8.0.


```
function transferOwnership(address newOwner) public virtual onlyOwner {
    require(newOwner != address(0), "Ownable: new owner is the zero address"
);
}
```

```
function transferAdmin(address newOwner) public onlyOwner {
    dividendTracker.excludeFromDividends(newOwner);
    _isExcludedFromFees[newOwner] = true;
    transferOwnership(newOwner);
}
```

RECOMMENDATION

Remove redundant code.



| Identifier | Definition | Severity |
|------------|----------------------|---|
| COM-03 | Hardcoded gas amount | Minor  |

```
Gas amount is set to gasForProcessing = 300000;  
function processDividendTracker(uint256 gas) external {  
    (uint256 iterations, uint256 claims, uint256 lastProcessedIndex) =  
    dividendTracker.process(gas);
```

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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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