



# Smart Contract Security Audit

## Audit details:

Audited project:	Cheecoin
Deployer address:	0x9813e889c2d3a723ca67906b031ae41e002eaeca
Client contacts:	Cheecoin team
Blockchain:	Binance Smart Chain
Project website:	Not provided

May, 2021  
TechRate

# Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed.

# Background

TechRate was commissioned by Cheecoin to perform an audit of smart contracts:

- <https://bscscan.com/address/0x93e24685e41ca82fd7a66a69c64f3decac789281#code>

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

# Contracts details

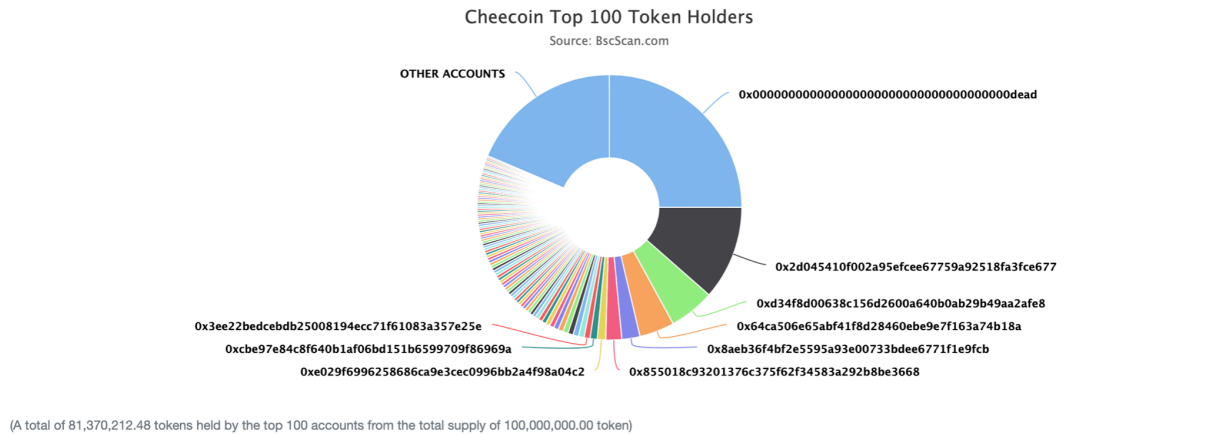
Token contract details for 10.05.2021.

Contract name:	Cheecoin
Contract address:	0x93e24685e41ca82fd7a66a69c64f3decac789281
Total supply:	1000000000000000000
Token ticker:	CHEE
Decimals:	9
Token holders:	2162
Transactions count:	8573
Top 100 holders dominance:	81.37 %
Liquidity fee:	3
Tax fee:	3
Total fees:	3359868281858748
Pancake pair:	0x64ca506e65abf41f8d28460ebe9e7f163a74b18a
Contract deployer address:	0x9813e889c2d3a723ca67906b031ae41e002eaeca
Contract's current owner address:	0x9813e889c2d3a723ca67906b031ae41e002eaeca

## Cheecoin token distribution

💡 The top 100 holders collectively own 81.37% (81,370,212.48 Tokens) of Cheecoin

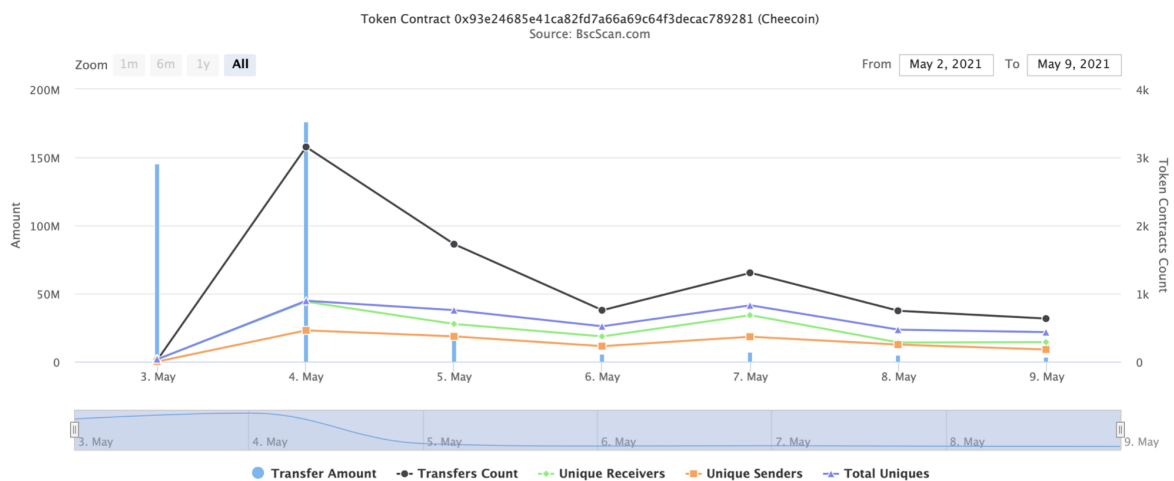
💡 Token Total Supply: 100,000,000.00 Token | Total Token Holders: 2,162





## Cheecoin contract interaction details

### Time Series: Token Contract Overview




Mon 3, May 2021 - Sun 9, May 2021



# Cheecoin top 10 token holders

Rank	Address	Quantity (Token)	Percentage
1	0x00000000000000000000000000000000dead	25,000,000	25.0000%
2	 0x2d045410f002a95efcee67759a92518fa3fce677	11,457,341.200034053	11.4573%
3	0xd34f8d00638c156d2600a640b0ab29b49aa2afe8	5,555,700.332028289	5.5557%
4	 0x64ca506e65abf41f8d28460ebe9e7f163a74b18a	4,279,882.070616336	4.2799%
5	0x8aeb36f4bf2e5595a93e00733bdee6771f1e9fcb	2,209,680.648543156	2.2097%
6	0x855018c93201376c375f62f34583a292b8be3668	1,962,588.23225322	1.9626%
7	0xe029f6996258686ca9e3cec0996bb2a4f98a04c2	1,025,933.261142348	1.0259%
8	0xcbe97e84c8f640b1af06bd151b6599709f86969a	868,353.543981572	0.8684%
9	0x3ee22bedcebdb25008194ecc71f61083a357e25e	725,980.134340268	0.7260%
10	0x80a608fa44381d589fac3e1998ac4eb6bbdd88cd	694,824.60033804	0.6948%

# Cheecoin LP top 10 token holders

Rank	Address	Quantity	Percentage
1	 0xaf8af015e529e5b7359850fec107e6e5cf47d25b	0.65246826815669641	44.6315%
2	 0xeb3a9c56d963b971d320f889be2fb8b59853e449	0.634570844073107254	43.4073%
3	0x9813e889c2d3a723ca67906b031ae41e002eaeca	0.164707603836984544	11.2667%
4	0x07d80ae6f36a5e08dca74ce884a24d39db9934ed	0.009946835886567611	0.6804%
5	0xc5a21b1abee896ceda7342d9e0f1799fa5eeef2a	0.000143885553956128	0.0098%
6	0x89be75df6c8c2bae9172de6acc2d5d589df02f7e	0.000062133889912256	0.0043%
7	 0x00	0.000000000000001	0.0000%

# Issues Checking Status

№	Issue description.	Checking status
1	Compiler warnings.	Passed
2	Race conditions and Reentrancy. Cross-function race conditions.	Passed
3	Possible delays in data delivery.	Passed
4	Oracle calls.	Passed
5	Front running.	Passed
6	Timestamp dependence.	Passed
7	Integer Overflow and Underflow.	Passed
8	DoS with Revert.	Passed
9	DoS with block gas limit.	Low issues
10	Methods execution permissions.	Passed
11	Economy model.	Passed
12	The impact of the exchange rate on the logic.	Passed
13	Private user data leaks.	Passed
14	Malicious Event log.	Passed
15	Scoping and Declarations.	Passed
16	Uninitialized storage pointers.	Passed
17	Arithmetic accuracy.	Passed
18	Design Logic.	Passed
19	Cross-function race conditions.	Passed
20	Safe Zeppelin module.	Passed
21	Fallback function security.	Passed

# Functions outline

## + [Int] IERC20

- [Ext] totalSupply
- [Ext] balanceOf
- [Ext] transfer #
- [Ext] allowance
- [Ext] approve #
- [Ext] transferFrom #

## + [Lib] SafeMath

- [Int] add
- [Int] sub
- [Int] sub
- [Int] mul
- [Int] div
- [Int] div
- [Int] mod
- [Int] mod

## + Context

- [Int] \_msgSender
- [Int] \_msgData

## + [Lib] Address

- [Int] isContract
- [Int] sendValue #
- [Int] functionCall #
- [Int] functionCall #
- [Int] functionCallWithValue #
- [Int] functionCallWithValue #
- [Prv] \_functionCallWithValue #

## + Ownable (Context)

- [Pub] <Constructor> #
- [Pub] owner
- [Pub] renounceOwnership #
  - modifiers: onlyOwner
- [Pub] transferOwnership #
  - modifiers: onlyOwner
- [Pub] geUnlockTime
- [Pub] lock #
  - modifiers: onlyOwner
- [Pub] unlock #

## + [Int] IUniswapV2Factory



- [Ext] feeTo
- [Ext] feeToSetter
- [Ext] getPair
- [Ext] allPairs
- [Ext] allPairsLength
- [Ext] createPair #
- [Ext] setFeeTo #
- [Ext] setFeeToSetter #

#### + [Int] IUniswapV2Pair

- [Ext] name
- [Ext] symbol
- [Ext] decimals
- [Ext] totalSupply
- [Ext] balanceOf
- [Ext] allowance
- [Ext] approve #
- [Ext] transfer #
- [Ext] transferFrom #
- [Ext] DOMAIN\_SEPARATOR
- [Ext] PERMIT\_TYPEHASH
- [Ext] nonces
- [Ext] permit #
- [Ext] MINIMUM\_LIQUIDITY
- [Ext] factory
- [Ext] token0
- [Ext] token1
- [Ext] getReserves
- [Ext] price0CumulativeLast
- [Ext] price1CumulativeLast
- [Ext] kLast
- [Ext] mint #
- [Ext] burn #
- [Ext] swap #
- [Ext] skim #
- [Ext] sync #
- [Ext] initialize #

#### + [Int] IUniswapV2Router01

- [Ext] factory
- [Ext] WETH
- [Ext] addLiquidity #
- [Ext] addLiquidityETH (\$)
- [Ext] removeLiquidity #
- [Ext] removeLiquidityETH #
- [Ext] removeLiquidityWithPermit #
- [Ext] removeLiquidityETHWithPermit #

- [Ext] swapExactTokensForTokens #
- [Ext] swapTokensForExactTokens #
- [Ext] swapExactETHForTokens (\$)
- [Ext] swapTokensForExactETH #
- [Ext] swapExactTokensForETH #
- [Ext] swapETHForExactTokens (\$)
- [Ext] quote
- [Ext] getAmountOut
- [Ext] getAmountIn
- [Ext] getAmountsOut
- [Ext] getAmountsIn

#### + [Int] IUniswapV2Router02 (IUniswapV2Router01)

- [Ext] removeLiquidityETHSupportingFeeOnTransferTokens #
- [Ext] removeLiquidityETHWithPermitSupportingFeeOnTransferTokens #
- [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
- [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens (\$)
- [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

#### + Cheecoin (Context, IERC20, Ownable)

- [Pub] <Constructor> #
- [Pub] name
- [Pub] symbol
- [Pub] decimals
- [Pub] totalSupply
- [Pub] balanceOf
- [Pub] transfer #
- [Pub] allowance
- [Pub] approve #
- [Pub] transferFrom #
- [Pub] increaseAllowance #
- [Pub] decreaseAllowance #
- [Pub] isExcludedFromReward
- [Pub] totalFees
- [Pub] getCharityWallet
- [Ext] setCharityWallet #
  - modifiers: onlyOwner
- [Pub] deliver #
- [Pub] reflectionFromToken
- [Pub] tokenFromReflection
- [Pub] excludeFromReward #
  - modifiers: onlyOwner
- [Ext] includeInReward #
  - modifiers: onlyOwner
- [Prv] \_transferBothExcluded #
- [Pub] excludeFromFee #
  - modifiers: onlyOwner

- [Pub] includeInFee #
  - modifiers: onlyOwner
- [Ext] setTaxFeePercent #
  - modifiers: onlyOwner
- [Ext] setCharityFeePercent #
  - modifiers: onlyOwner
- [Ext] setLiquidityFeePercent #
  - modifiers: onlyOwner
- [Ext] setSellCapPercent #
  - modifiers: onlyOwner
- [Ext] setSellCapMinimum #
  - modifiers: onlyOwner
- [Pub] setSellCapEnabled #
  - modifiers: onlyOwner
- [Pub] setSwapAndLiquifyEnabled #
  - modifiers: onlyOwner
- [Ext] <Fallback> (\$)
- [Prv] \_reflectFee #
- [Prv] \_getValues
- [Prv] \_getTValues
- [Prv] \_getRValues
- [Prv] \_getRate
- [Prv] \_getCurrentSupply
- [Prv] \_takeLiquidity #
- [Prv] \_takeCharity #
- [Prv] calculateTaxFee
- [Prv] calculateLiquidityFee
- [Prv] calculateCharityFee
- [Prv] removeAllFee #
- [Prv] restoreAllFee #
- [Pub] isExcludedFromFee
- [Prv] \_approve #
- [Pub] isSellTransaction
- [Prv] \_transfer #
- [Prv] swapAndLiquify #
  - modifiers: lockTheSwap
- [Prv] swapTokensForEth #
- [Prv] addLiquidity #
- [Prv] \_tokenTransfer #
- [Prv] \_transferStandard #
- [Prv] \_transferToExcluded #
- [Prv] \_transferFromExcluded #

(\$ ) = payable function

# = non-constant function

# Security Issues

## High Severity Issues

No high severity issues found.

## Medium Severity Issues

No medium severity issues found.

## Low Severity Issues

### 1. Out of gas

Issue:

- ❑ The function `includeInReward()` uses the loop to find and remove addresses from the `_excluded` list. Function will be aborted with `OUT_OF_GAS` exception if there will be a long excluded addresses list.

```
function includeInReward(address account↑) external onlyOwner() {
    require(!_isExcluded[account↑], "Account is already excluded");
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (_excluded[i] == account↑) {
            _excluded[i] = _excluded[_excluded.length - 1];
            _tOwned[account↑] = 0;
            _isExcluded[account↑] = false;
            _excluded.pop();
            break;
        }
    }
}
```

- ❑ The function `_getCurrentSupply` also uses the loop for evaluating total supply. It also could be aborted with `OUT_OF_GAS` exception if there will be a long excluded addresses list.

```
function _getCurrentSupply() private view returns (uint256, uint256) {
    uint256 rSupply = _rTotal;
    uint256 tSupply = _tTotal;
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (_rOwned[_excluded[i]] > rSupply || _tOwned[_excluded[i]] > tSupply) return (_rTotal, _tTotal);
        rSupply = rSupply.sub(_rOwned[_excluded[i]]);
        tSupply = tSupply.sub(_tOwned[_excluded[i]]);
    }
    if (rSupply < _rTotal.div(_tTotal)) return (_rTotal, _tTotal);
    return (rSupply, tSupply);
}
```

Recommendation:

Use EnumerableSet instead of array or do not use long arrays.

## Owner privileges

- ❑ Owner can change the tax, charity and liquidity fee.
- ❑ Owner can change the charity address.
- ❑ Owner can change the sell cap minimum, sell cap percent and sell cap enabled status.
- ❑ Owner can change the maximum transaction amount.
- ❑ Owner can exclude from the fee.

## Conclusion

Smart contracts contain low severity issues and owner privileges! Liquidity pair contract's security is not checked due to out of scope.

Liquidity is added to the owner wallet and should be locked by the 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
    );
}
```

No liquidity locking details provided by the team or found on DXSale / Unicrypt.

Techrate note:

*Please check the disclaimer above and note, the audit makes no statements or warranties on business model, investment attractiveness or code sustainability. The report is provided for the only contract mentioned in the report and does not include any other potential contracts deployed by Owner.*