
# Smart Contract Security Audit

## Audit details:

| | |
|---|---|
| Audited project: | MAD Token |
| Deployer address: | 0xDcc617dbc26D213f3accA1ea6d87893bCA01Df5B |
| Client contacts: | MAD Token team |
| Blockchain: | Binance Smart Chain |
| Project website: | https://MADToken.org |

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 MAD Token to perform an audit of smart contracts:

- *https://bscscan.com/address/0x4D5eCA1e4FE912904544043feCEB6858DDd3d866#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

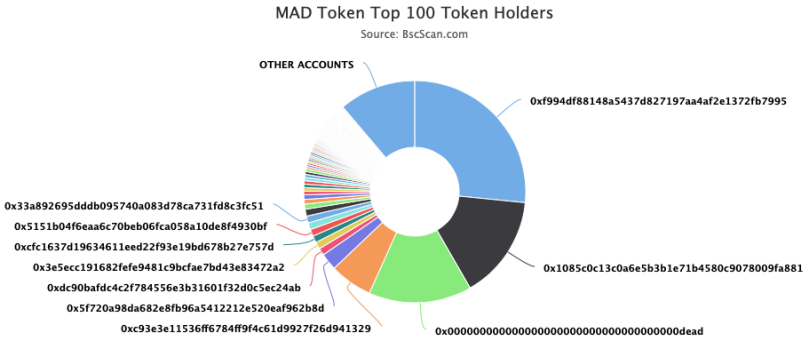
## Token contract details for 19.05.2021.

| | |
|---|---|
| Contract name: | MAD Token |
| Contract address: | 0x4D5eCA1e4FE912904544043feCEB6858DDd3d866 |
| Total supply: | 100_000_000_000_000_000_000 |
| Token ticker: | MAD |
| Decimals: | 9 |
| Token holders: | 818 |
| Transactions count: | 2,896 |
| Top 100 holders dominance: | 88.79% |
| Liquidity fee: | 2 |
| Tax fee: | 2 |
| Total fees: | 4177196692538177947 |
| Uniswap V2 pair: | 0x1085c0c13c0a6e5b3b1e71b4580c9078009fa881 |
| Contract deployer address: | 0xDcc617dbc26D213f3accA1ea6d87893bCA01Df5B |
| Contract’s current owner address: | 0x0000000000000000000000000000000000000000 |

# MAD Token token distribution

The top 100 holders collectively own 88.79% (88,793,563,958.76 Tokens) of MAD Token

Token Total Supply: 100,000,000,000.00 Token | Total Token Holders: 818

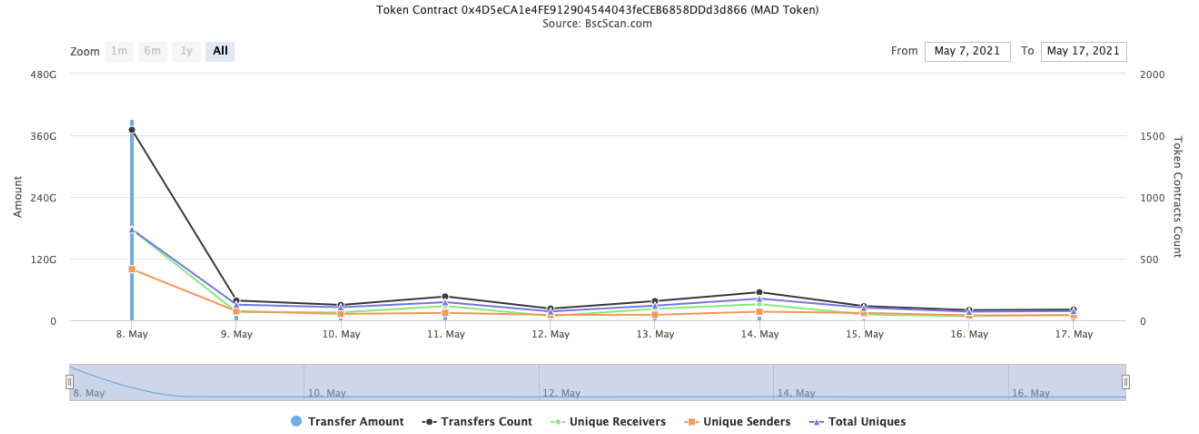



(A total of 88,793,563,958.76 tokens held by the top 100 accounts from the total supply of 100,000,000,000.00 token)

# MAD Token contract interaction details

Time Series: Token Contract Overview

Sat 8, May 2021 - Mon 17, May 2021



# MAD Token top 10 token holders

| Rank | Address | Quantity (Token) | Percentage |
|---|---|---|---|
| 1 | 0xf994df88148a5437d827197aa4af2e1372fb7995 | 26,581,440,631.366948978 | 26.5814% |
| 2 | 0x1085c0c13c0a6e5b3b1e71b4580c9078009fa881 | 15,119,074,228.474798877 | 15.1191% |
| 3 | 0x000000000000000000000000000000000000dead | 15,000,000,000 | 15.0000% |
| 4 | 0xc93e3e11536ff6784ff9f4c61d9927f26d941329 | 6,218,263,516.638378864 | 6.2183% |
| 5 | 0x5f720a98da682e8fb96a5412212e520eaf962b8d | 2,479,647,369.566060303 | 2.4796% |
| 6 | 0xdc90bafdc4c2f784556e3b31601f32d0c5ec24ab | 1,039,758,852.808082171 | 1.0398% |
| 7 | 0x3e5ecc191682fefe9481c9bcfae7bd43e83472a2 | 1,029,307,327.01153111 | 1.0293% |
| 8 | 0xcfc1637d19634611eed22f93e19bd678b27e757d | 1,004,900,858.877823981 | 1.0049% |
| 9 | 0x5151b04f6eaa6c70beb06fca058a10de8f4930bf | 1,000,007,216.578626574 | 1.0000% |
| 10 | 0x1f2452e26809f280f5e21dfb230c1f4cce4df089 | 1,000,000,000.000626574 | 1.0000% |

# MAD Token LP token holders

| Rank | Address | Quantity | Percentage | Analytics |
|---|---|---|---|---|
| 1 | 0x50039851a2be04f083ae3a09ff72aa84ab188be0 | 62.584922018549482886 | 100.0000% | |
| 2 | 0x0000000000000000000000000000000000000000 | 0.000000000000001 | 0.0000% | |

# Contract functions details

+ [Int] IERC20
  - [Ext] totalSupply
  - [Ext] balanceOf
  - [Ext] transfer #
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transferFrom #

+ [Lib] SafeMath
  - [Int] tryAdd
  - [Int] trySub
  - [Int] tryMul
  - [Int] tryDiv
  - [Int] tryMod
  - [Int] add
  - [Int] sub
  - [Int] mul
  - [Int] div
  - [Int] mod
  - [Int] sub
  - [Int] div
  - [Int] mod

+ Context
  - [Int] _msgSender
  - [Int] _msgData

+ [Lib] Address
  - [Int] isContract
  - [Int] sendValue #
  - [Int] functionCall #
  - [Int] functionCall #
  - [Int] functionCallWithValue #
  - [Int] functionCallWithValue #
  - [Int] functionStaticCall
  - [Int] functionStaticCall
  - [Int] functionDelegateCall #
  - [Int] functionDelegateCall #
  - [Prv] _verifyCallResult

+ Ownable (Context)
  - [Pub] <Constructor> #
  - [Pub] owner
  - [Pub] renounceOwnership #
    - modifiers: onlyOwner

  - [Pub] transferOwnership #
    - modifiers: onlyOwner

+ [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 #

+ MADToken (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] 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] setMaxTxPercent #
  - 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] calculateCharityFee
- [Prv] calculateLiquidityFee
- [Prv] removeAllFee #
- [Prv] restoreAllFee #
- [Pub] isExcludedFromFee
- [Prv] _approve #
- [Prv] _transfer #
- [Prv] swapAndLiquify #
  - modifiers: lockTheSwap
- [Prv] swapTokensForEth #
- [Prv] addLiquidity #
- [Prv] _tokenTransfer #
- [Prv] _transferStandard #
- [Prv] _transferToExcluded #
- [Prv] _transferFromExcluded #

($) = payable function
# = non-constant function

# Issues Checking Status

| № | Issue description. | Checking status |
|---|---|---|
| 1 | Compiler errors. | 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 of the contract. | 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 Open Zeppelin contracts implementation and usage. | Passed |
| 21 | Fallback function security. | Passed |

# 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 (In the period when the owner is not renounced)

- ❏ Owner can change the tax, liquidity and charity fee.

```
function setTaxFeePercent(uint256 taxFee) external onlyOwner() {
    _taxFee = taxFee;
}

function setCharityFeePercent(uint256 charityFee) external onlyOwner() {
    _charityFee = charityFee;
}

function setLiquidityFeePercent(uint256 liquidityFee) external onlyOwner() {
    _liquidityFee = liquidityFee;
}
```

- ❏ Owner can change the maximum transaction amount.

```
function setMaxTxPercent(uint256 maxTxPercent⬆) external onlyOwner() {
    _maxTxAmount = _tTotal.mul(maxTxPercent⬆).div(
        10**2
    );
}
```

- ❏ Owner can exclude from the fee.

```
function excludeFromFee(address account⬆) public onlyOwner {
    _isExcludedFromFee[account⬆] = true;
}
```

# Conclusion

**Smart contracts contain low severity issues. LP pair contract is not checked.**

**Liquidity locking details provided by the team:**
**LP is locked until January 2023**
**https://dxsale.app/app/pages/defipresale?saleID=670&chain=BSC**

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