



Smart Contract Security Audit

Audit details:

| | |
|-------------------|---|
| Audited project: | BALLS |
| Deployer address: | 0x357B174d3690998845c0A5D3B2762E8c600BB814 |
| Client contacts: | BALLS team |
| Blockchain: | Binance Smart Chain |
| Project website: | https://balls.health/ |

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 BALLS to perform an audit of smart contracts:

- <https://bscscan.com/address/0x06454B893DAdF2bb5cC00D3caDd5905Cdb6AC102#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 27.05.2021.

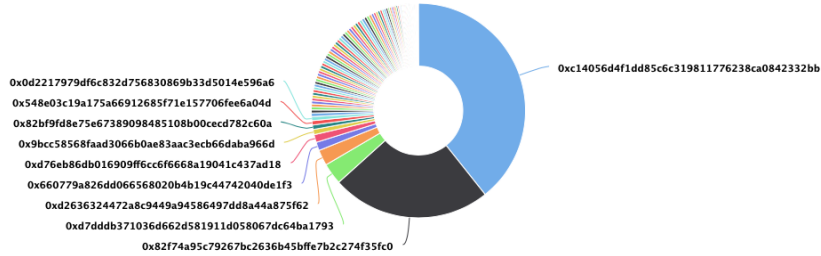
| | |
|--|---|
| Contract name: | BALLS |
| Contract address: | 0x06454B893DAdF2bb5cC00D3caDd5905Cdb6AC102 |
| Total supply: | 850112198338597859780 |
| Token ticker: | BALLS |
| Decimals: | 850112198338597859780 |
| Token holders: | 2,506 |
| Transactions count: | 44,245 |
| Top 100 holders dominance: | 100.47% |
| Tax fee: | 300 |
| Total fees: | 84793571021952314407 |
| Contract deployer address: | 0x357B174d3690998845c0A5D3B2762E8c600BB814 |
| Contract's current owner address: | 0x82f74a95c79267bc2636b45bffe7b2c274f35fc0 |

BALLS token distribution

The top 100 holders collectively own 100.47% (854,124,480,432.16 Tokens) of BALLS

Token Total Supply: 850,112,198,338.60 Token | Total Token Holders: 2,506

BALLS Top 100 Token Holders
Source: BscScan.com

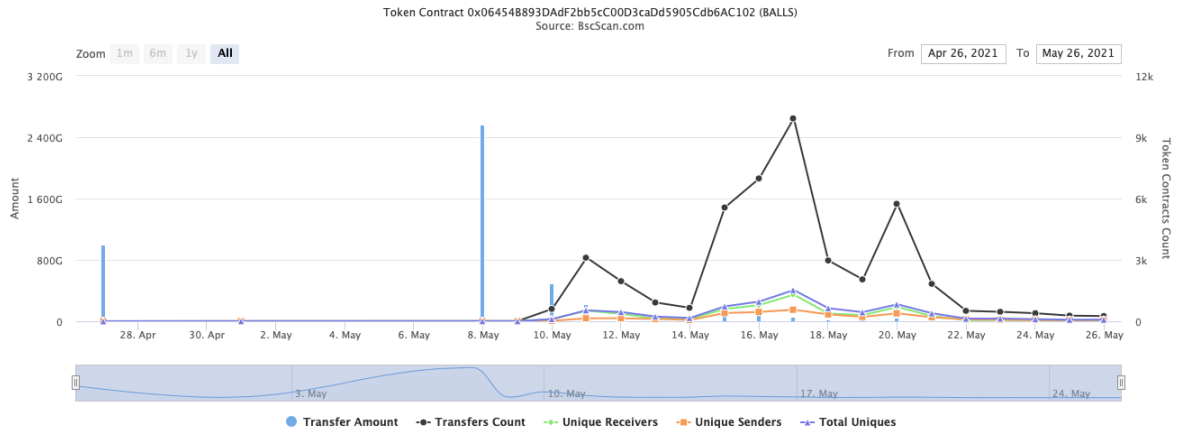


(A total of 854,124,480,432.16 tokens held by the top 100 accounts from the total supply of 850,112,198,338.60 token)

BALLS contract interaction details

Time Series: Token Contract Overview

Tue 27, Apr 2021 - Wed 26, May 2021



BALLS top 10 token holders

| Rank | Address | Quantity (Token) | Percentage |
|------|--|---------------------------|------------|
| 1 | 0xc14056d4f1dd85c6c319811776238ca0842332bb | 335,614,740,238.892198819 | 39.4789% |
| 2 | 0x82f74a95c79267bc2636b45bffe7b2c274f35f0 | 205,576,027,377.718790503 | 24.1822% |
| 3 | 0xd7ddb371036d662d581911d058067dc64ba1793 | 27,389,086,291.32954607 | 3.2218% |
| 4 | 0xd2636324472a8c9449a94586497dd8a44a875f62 | 20,209,228,327.677967735 | 2.3772% |
| 5 | 0x660779a826dd066568020b4b19c44742040de1f3 | 10,999,163,634.69086797 | 1.2938% |
| 6 | 0xd76eb86db016909ff6cc6f6668a19041c437ad18 | 9,953,089,384.0527377 | 1.1708% |
| 7 | 0x9bcc58568faad3066b0ae83aac3ecb66daba966d | 6,677,212,015.195665631 | 0.7855% |
| 8 | 0x82bf9fd8e75e67389098485108b0cceed782c60a | 5,746,204,523.410615702 | 0.6759% |
| 9 | 0x548e03c19a175a66912685f71e157706fee6a04d | 5,631,812,147.6529965 | 0.6625% |
| 10 | 0x0d2217979df6c832d756830869b33d5014e596a6 | 5,084,150,404.69505165 | 0.5981% |

Contract functions details

- + Context
 - [Int] _msgSender
 - [Int] _msgData
- + [Int] IBEP20
 - [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
- + [Lib] Address
 - [Int] isContract
 - [Int] sendValue #
 - [Int] functionCall #
 - [Int] functionCall #
 - [Int] functionCallWithValue #
 - [Int] functionCallWithValue #
 - [Prv] _functionCallWithValue #
- + Ownable (Context)
 - [Pub] owner
 - [Pub] renounceOwnership #
 - modifiers: onlyOwner
 - [Pub] transferOwnership #
 - modifiers: onlyOwner
- + CoinToken (Context, IBEP20, 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] isExcluded
- [Pub] isCharity
- [Pub] totalFees
- [Pub] totalBurn
- [Pub] totalCharity
- [Pub] deliver #
- [Pub] reflectionFromToken
- [Pub] tokenFromReflection
- [Ext] excludeAccount #
 - modifiers: onlyOwner
- [Ext] includeAccount #
 - modifiers: onlyOwner
- [Ext] setAsCharityAccount #
 - modifiers: onlyOwner
- [Pub] burn #
- [Pub] updateFee #
 - modifiers: onlyOwner
- [Int] _burn #
- [Pub] mint #
 - modifiers: onlyOwner
- [Prv] _approve #
- [Prv] _transfer #
- [Prv] _transferStandard #
- [Prv] _standardTransferContent #
- [Prv] _transferToExcluded #
- [Prv] _excludedFromTransferContent #
- [Prv] _transferFromExcluded #
- [Prv] _excludedToTransferContent #
- [Prv] _transferBothExcluded #
- [Prv] _bothTransferContent #
- [Prv] _reflectFee #
- [Prv] _getValues
- [Prv] _getTBasics
- [Prv] getTTransferAmount
- [Prv] _getRBasics
- [Prv] _getRTransferAmount
- [Prv] _getRate
- [Prv] _getCurrentSupply
- [Prv] _sendToCharity #
- [Prv] removeAllFee #
- [Prv] restoreAllFee #
- [Prv] _getTaxFee

(\$) = 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. | High issues |
| 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

1. Wrong burn and mint

Issue:

In burn and mint functions there are wrong values adding because of not converting `_value`. `_rOwned` and `_tTotal` show balances in different modes and same values will be added / subtracted to them, which will make it wrong.

```
function _burn(address _who↑, uint256 _value↑) internal {
    require(_value↑ <= _rOwned[_who↑]);
    _rOwned[_who↑] = _rOwned[_who↑].sub(_value↑);
    _tTotal = _tTotal.sub(_value↑);
    emit Transfer(_who↑, address(0), _value↑);
}

function mint(address account↑, uint256 amount↑) onlyOwner() public {

    _tTotal = _tTotal.add(amount↑);
    _rOwned[account↑] = _rOwned[account↑].add(amount↑);
    emit Transfer(address(0), account↑, amount↑);
}
```

Recommendation:

Please check if the addresses are included in reward or not and add the values correctly by multiplying by the rate.

Medium Severity Issues

No medium severity issues found.

Low Severity Issues

1. Out of gas

Issue:

- ❑ The function `includeAccount()` 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 exclude from the fee.

```

function excludeAccount(address account) external onlyOwner() {
    require(!_isExcluded[account], "Account is already excluded");
    if (_rOwned[account] > 0) {
        _tOwned[account] = tokenFromReflection(_rOwned[account]);
    }
    _isExcluded[account] = true;
    _excluded.push(account);
}

```

- ❑ Owner can change charity address

```
function setAsCharityAccount(address account) external onlyOwner() {
    require(!_isCharity[account], "Account is already charity account");
    _isCharity[account] = true;
    FeeAddress = account;
}
```

❑ Owner can mint

```
function mint(address account, uint256 amount) onlyOwner() public {

    _tTotal = _tTotal.add(amount);
    _rOwned[account] = _rOwned[account].add(amount);
    emit Transfer(address(0), account, amount);
}
```

❑ Owner can change fees

```
function updateFee(uint256 _txFee,uint256 _burnFee,uint256 _charityFee) onlyOwner() public{
    _TAX_FEE = _txFee* 100;
    _BURN_FEE = _burnFee * 100;
    _CHARITY_FEE = _charityFee* 100;
    ORIG_TAX_FEE = _TAX_FEE;
    ORIG_BURN_FEE = _BURN_FEE;
    ORIG_CHARITY_FEE = _CHARITY_FEE;
}
```

Conclusion

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

Liquidity locking details provided by the team:

<https://dxsale.app/app/pages/defipresale?saleID=707&chain=BSC>

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.