Smart Contract Security Audit

Audit details:

Audited project:	BELLACIAO TOKEN
Deployer address	0xb23e7930112c452bb3a4f25ca52315ae724b127
Blockchain:	Binance Smart Chain
Project website:	https://www.bellaciao.finance/

June, 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 BELLACIAO TOKEN to perform an audit of smart contracts:

https://bscscan.com/token/0xb23e7930112c452bb3a4f25ca52315ae724b12d7

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.

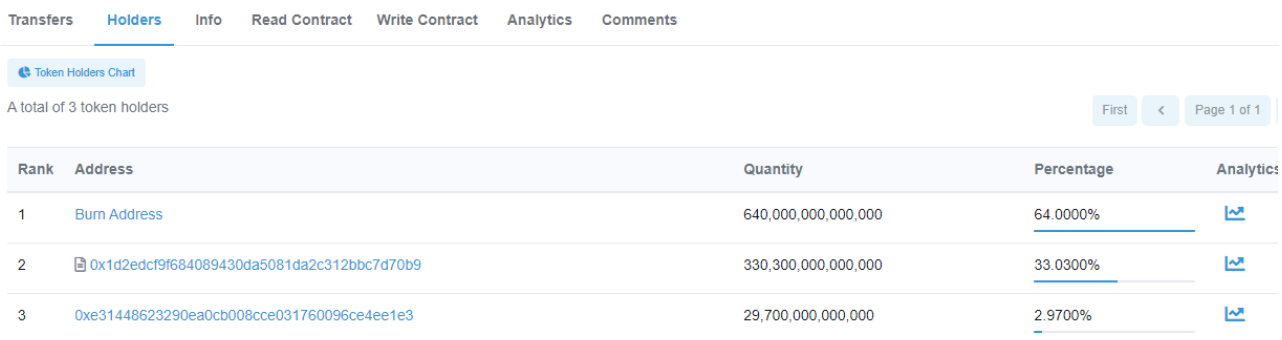
The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

Contracts details

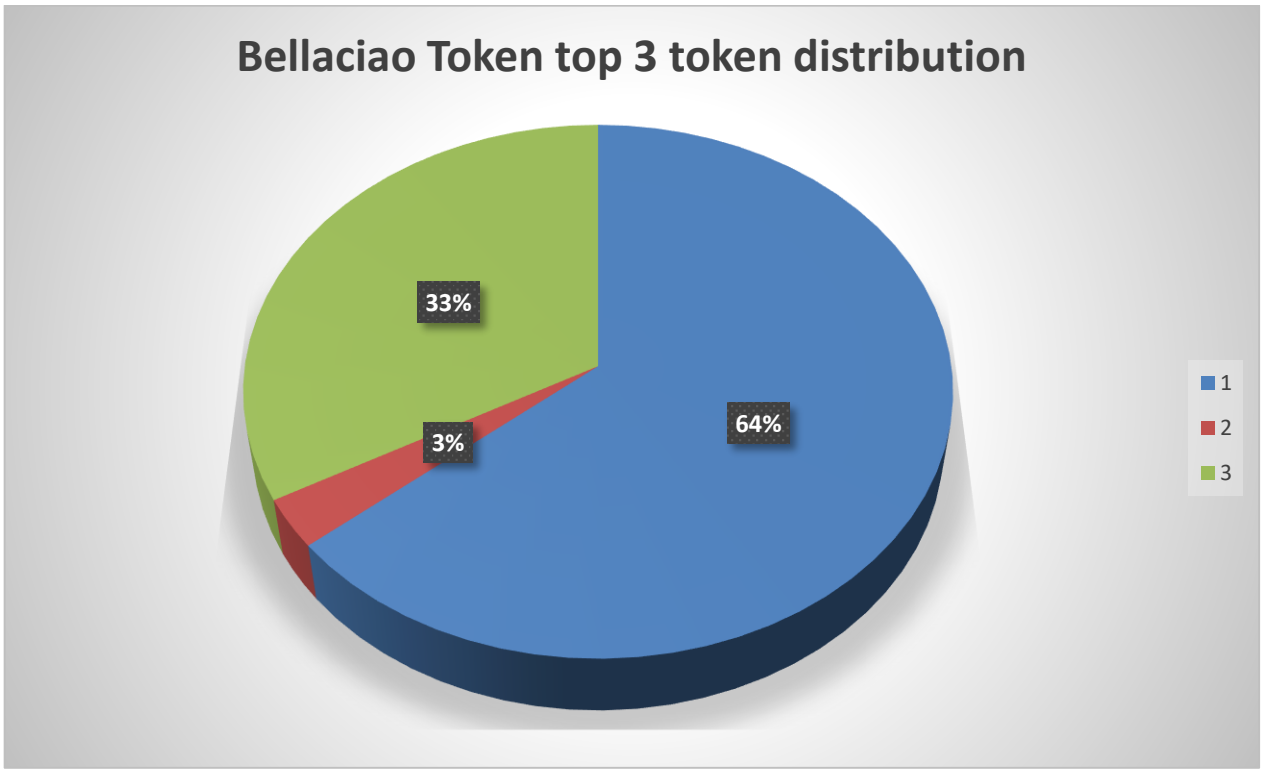
Token contract details for 01.05.2021.

Contract name:	BELLACIAO TOKEN
Compiler version:	v0.8.4+commit.c7e474f2
Contract address:	0xB23E7930112c452bb3a4F25cA52315aE724b12d7
Total supply:	100_000_000_000_000_000_000
Token ticker:	BELLACIAO
Decimals:	9
Token holders:	3
Transactions count:	3
Top 100 holders dominance:	36 %
Contract deployer address:	0xe31448623290ea0cb008cce031760096ce4ee1e3
Contract's current owner address:	0xe31448623290ea0cb008cce031760096ce4ee1e3

Bellaciao Token top 3 token holders



Bellaciao Token top 3 token distribution



Masterchef contract details for 01.05.2021.

Contract name:	MasterChef
Compiler version:	v0.8.4+commit.c7e474f2
Contract address:	0xB23E7930112c452bb3a4F25cA52315aE724b12d7
Dev address:	0xe31448623290ea0cb008cce031760096ce4ee1e3
Fee address:	0x2cb148ed9312ca5db250ac43e059cb8de6336213
Token contract address:	0xB23E7930112c452bb3a4F25cA52315aE724b12d7
Token per block:	1_000_000_000_000_000_000
Contract owner address:	0xe31448623290ea0cb008cce031760096ce4ee1e3
Pool length:	27
Start block:	7109999
Total alloc point:	13400
Bonus multiplier:	1

Referral commission rate:	200
Referral contract address:	0xe31448623290ea0cb008cce031760096ce4ee1e3

Transaction Receipt Event Logs

Address

0xb23e7930112c452bb3a4f25ca52315ae724b12d7

Name

OwnershipTransferred (index_topic_1 address previousOwner, index_topic_2 address newOwner)

Topics

0 0x8be0079c531659141344cd1fd0a4f28419497f9722a3daafe3b4186f6b6457e0

1 Dec 0x0000000000000000000000000000000000000000

2 Dec 0xe31448623290ea0cb008cce031760096ce4ee1e3

Address

0xca143ce32fe78f1f7019d7d551a6402fc5350c73

Name

PairCreated (index_topic_1 address token0, index_topic_2 address token1, address pair,)

Topics

0 0x0d3648bd0f6ba80134a33ba9275ac585d9d315f0ad8355cddefde31afa28d0e9

1 Dec 0xb23e7930112c452bb3a4f25ca52315ae724b12d7

2 Dec 0xbb4cdb9cbd36b01bd1cbaebf2de08d9173bc095c

Data

pair :0x9ef888a9d6aabdea9fa9dc07fbc4f8fad9627d36

Address

0xb23e7930112c452bb3a4f25ca52315ae724b12d7

Name

Transfer (index_topic_1 address from, index_topic_2 address to, uint256 value)

Topics

0 0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef

1 Dec 0x0000000000000000000000000000000000000000

2 Dec 0xe31448623290ea0cb008cce031760096ce4ee1e3

Data

value :100000000000000000000000

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.	Medium issues
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

1. Wrong burning

Issue:

There is sending tokens to the dead address in overridden _transfer functions, instead of burning them in token contract.

```
function _transfer(address sender↑, address recipient↑, uint256 amount↑) internal virtual override {
    if (recipient↑ == BURN_ADDRESS) {
        super._transfer(sender↑, recipient↑, amount↑);
    } else {
        // 2% of every transfer burnt
        uint256 burnAmount = amount↑.mul(2).div(100);
        // 98% of transfer sent to recipient
        uint256 sendAmount = amount↑.sub(burnAmount);
        require(amount↑ == sendAmount + burnAmount, "JAGUAR::transfer: Burn value invalid");

        super._transfer(sender↑, BURN_ADDRESS, burnAmount);
        super._transfer(sender↑, recipient↑, sendAmount);
        amount↑ = sendAmount;
    }
}
```

Recommendation:

There should be a burn instead of sending to the dead address.

Low Severity Issues

1. Block gas limit

Issue:

The updateEmissionRate function can fail due to block gas limit if the pool size is too big.

```
function updateEmissionRate() public {
    require(block.number > startBlock, "updateEmissionRate: Can only be called after mining starts");
    require(jaguarPerBlock > MINIMUM_EMISSION_RATE, "updateEmissionRate: Emission rate has reached the minimum threshold");

    uint256 currentIndex = block.number.sub(startBlock).div(EMISSION_REDUCTION_PERIOD_BLOCKS);
    if (currentIndex <= lastReductionPeriodIndex) {
        return;
    }

    uint256 newEmissionRate = jaguarPerBlock;
    for (uint256 index = lastReductionPeriodIndex; index < currentIndex; ++index) {
        newEmissionRate = newEmissionRate.mul(1e4 - EMISSION_REDUCTION_RATE_PER_PERIOD).div(1e4);
    }

    newEmissionRate = newEmissionRate < MINIMUM_EMISSION_RATE ? MINIMUM_EMISSION_RATE : newEmissionRate;
    if (newEmissionRate >= jaguarPerBlock) {
        return;
    }

    massUpdatePools();
    lastReductionPeriodIndex = currentIndex;
    uint256 previousEmissionRate = jaguarPerBlock;
    jaguarPerBlock = newEmissionRate;
    emit EmissionRateUpdated(msg.sender, previousEmissionRate, newEmissionRate);
}
```

2. add function issue

Issue:

If some LP token is added to the contract twice using function add, then the total amount of reward Bellaciao Token Reward in function updatePool will be incorrect.

```
function add(uint256 _allocPoint⬆, IBEP20 _lpToken⬆, uint16 _depositFeeBP⬆, bool _withUpdate⬆) public onlyOwner {
    require(_depositFeeBP⬆ <= 10000, "add: invalid deposit fee basis points");
    if (_withUpdate⬆) {
        massUpdatePools();
    }
    uint256 lastRewardBlock = block.number > startBlock ? block.number : startBlock;
    totalAllocPoint = totalAllocPoint.add(_allocPoint⬆);
    poolInfo.push(PoolInfo({
        lpToken: _lpToken⬆,
        allocPoint: _allocPoint⬆,
        lastRewardBlock: lastRewardBlock,
        accJaguarPerShare: 0,
        depositFeeBP: _depositFeeBP⬆
    }));
}
```

Recommendation:

Add the mapping from address to bool and check that same address will not be added twice.

Owner privileges

- ❏ Owner can withdraw tokens sent by mistake from the Referral contract.
- ❏ Owner can change the operator of the Referral contract and record Referral.
- ❏ Owner can change the jaguar referral.

Conclusion

Smart contracts contain medium severity and low severity issues.

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.