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AUDIT COMPANY

Smart Contract Security Audit

TechRate

November, 2021

Audit Details

Audited project

JoJo Inu

Deployer address

0x6FD33827Fe0F2293165123F42E9B49D71102a9D9

Client contacts:

JoJo Inu team

Blockchain

Ethereum

Project website:

https://jojoinu.com

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 JoJo Inu to perform an audit of smart contracts:
https://etherscan.io/address/0xe18024f4838962d61eb591982390dffc762f2cd7#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

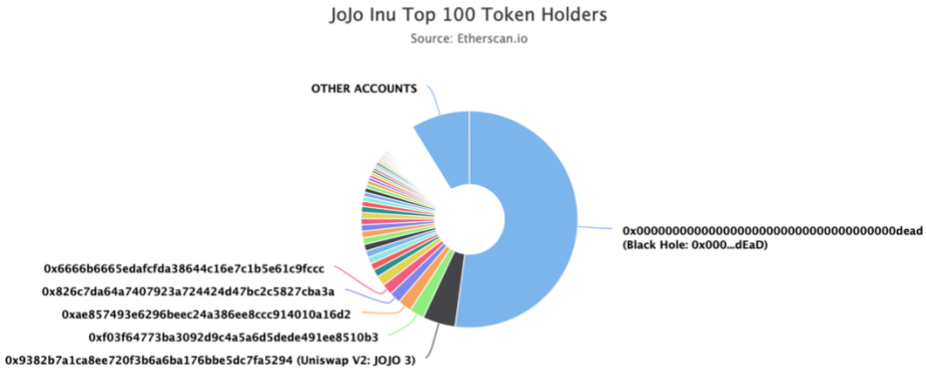
Token contract details for 30.11.2021

Contract name	JoJo Inu
Contract address	0xe18024f4838962D61eb591982390DFfC762f2cD7
Total supply	100,000,000,000,000,000
Token ticker	JOJO
Decimals	9
Token holders	984
Transactions count	2,543
Top 100 holders dominance	91.20%
Total fees	6,202,583,585,974,092.342946046
Contract deployer address	0x6FD33827Fe0F2293165123F42E9B49D71102a9D9
Contract's current owner address	0x0000000000000000000000000000000000000000

JoJo Inu Token Distribution

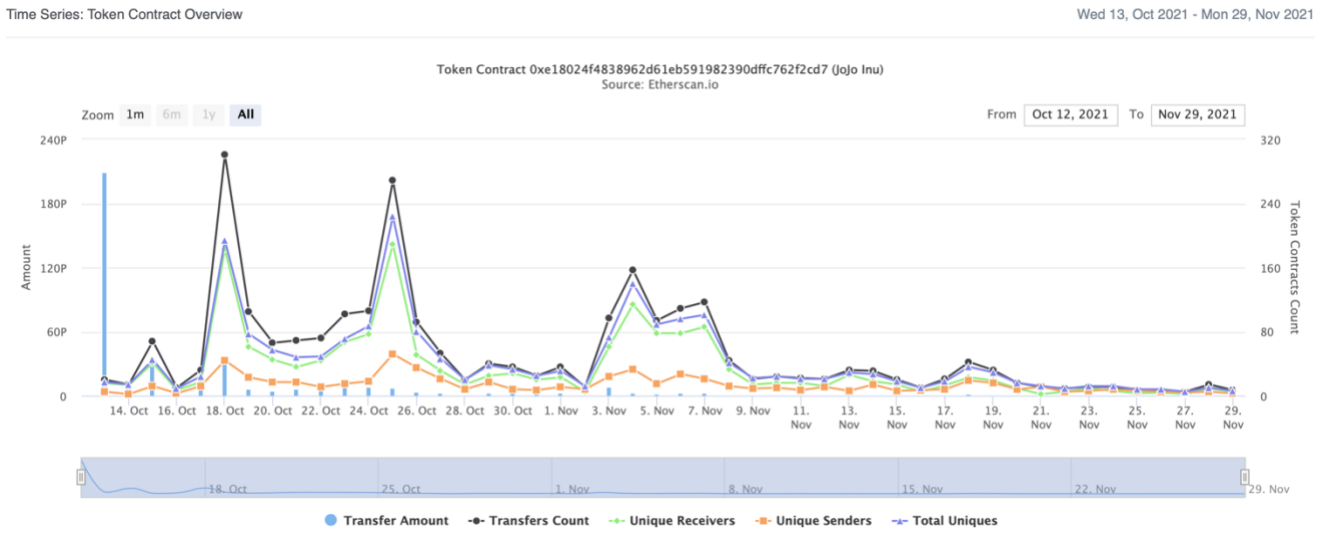
The top 100 holders collectively own 91.20% (91,202,774,248,645,000.00 Tokens) of JoJo Inu

Token Total Supply: 100,000,000,000,000,000.00 Token | Total Token Holders: 984



(A total of 91,202,774,248,645,000.00 tokens held by the top 100 accounts from the total supply of 100,000,000,000,000,000.00 token)

JoJo Inu Contract Interaction Details



JoJo Inu Top 10 Token Holders

Rank	Address	Quantity	Percentage
1	Black Hole: 0x000...dEaD	52,138,738,087,185,600.60217843	52.1387%
2	Uniswap V2: JOJO 3	4,862,520,516,868,100.23901412	4.8625%
3	0xf03f64773ba3092d9c4a5a6d5dede491ee8510b3	2,223,730,624,559,740.394265754	2.2237%
4	0xae857493e6296beec24a386ee8ccc914010a16d2	2,042,034,053,981,940.633777814	2.0420%
5	0x826c7da64a7407923a724424d47bc2c5827cba3a	1,709,678,576,024,530.564762016	1.7097%
6	0x6666b6665edafcfda38644c16e7c1b5e61c9fccc	1,644,717,780,608,570.058314951	1.6447%
7	0xc2c8e7f40468ae716126566571f48815dd9e7632	1,523,413,992,816,090.537828124	1.5234%
8	0x24c7dda4282e01d085b8e3e449168f16b069f994	1,107,723,311,394,140.594594569	1.1077%
9	0x25f75e7ee887f9576471a5d3d2374b85fdfc38ac	1,023,827,776,273,340.667858006	1.0238%
10	0x4d127832779d744efe16a20ecc28b2219de8de4d	1,013,282,477,167,520.770858666	1.0133%

Contract functions details

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

+ [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

+ [Lib] Address
  - [Int] isContract
  - [Int] sendValue #
  - [Int] functionCall #
  - [Int] functionCall #
  - [Int] functionCallWithValue #
  - [Int] functionCallWithValue #
  - [Prv] _functionCallWithValue #

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

+ JoJoInu (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] isExcluded
- [Pub] totalFees
- [Ext] setMaxTxPercent #
  - modifiers: onlyOwner
- [Pub] reflect #
- [Pub] reflectionFromToken
- [Pub] tokenFromReflection
- [Ext] excludeAccount #
  - modifiers: onlyOwner
- [Ext] includeAccount #
  - modifiers: onlyOwner
- [Prv] _approve #
- [Prv] _transfer #
- [Prv] _transferStandard #
- [Prv] _transferToExcluded #
- [Prv] _transferFromExcluded #
- [Prv] _transferBothExcluded #
- [Prv] _reflectFee #
- [Prv] _getValues
- [Prv] _getTValues
- [Prv] _getRValues
- [Prv] _getRate
- [Prv] _getCurrentSupply

($) = 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 `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 includeAccount(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:

Check that the excluded array length is not too big.

Owner privileges (In the period when the owner is not renounced)

- Owner can change maximum transaction limit.

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

- Owner can include in and exclude from reward.

```
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);
}

function includeAccount(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;
        }
    }
}
```

Conclusion

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

Liquidity locking details provided by the team:
https://etherscan.io/tx/0xd133ead5cf74107df6ae75aefa24472a18d709642df12f54f73d33308c01e136

Ownership renounce details provided by the team:
https://etherscan.io/tx/0xf1e639a9e9787da15e8553df5e7ccc339bf5664b48ad1d3e5f1a529f90ef509d

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.