



Smart Contract Security Audit Report

SAJA

February 2023

Security Status



www.hacksafe.io



Audit Details



Audited project

SAJA



Deployer address

0xafb0a9a275d015a87dd603f71991cc1b2fa60ad7



Client contacts

SAJA Team



Blockchain

Ethereum



Website

Not provided

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.

Procedure

Step 1 - In-Depth Manual Review

Manual line-by-line code reviews to ensure the logic behind each function is sound and safe from various attack vectors. This is the most important and lengthy portion of the audit process (as automated tools often cannot find the nuances that lead to exploits such as flash loan attacks).

Step 2 - Automated Testing

Simulation of a variety of interactions with your Smart Contract on a test blockchain leveraging a combination of automated test tools and manual testing to determine if any security vulnerabilities exist.

Step 3 – Leadership Review

The engineers assigned to the audit will schedule meetings with our leadership team to review the contracts, any comments or findings, and ask questions to further apply adversarial thinking to discuss less common attack vectors.

Step 4 - Resolution of Issues

Consulting with the team to provide our recommendations to ensure the code's security and optimize its gas efficiency, if possible. We assist project team's in resolving any outstanding issues or implementing our recommendations.

Step 5 - Published Audit Report

Boiling down results and findings into an easy-to-read report tailored to the project. Our audit reports highlight resolved issues and any risks that exist to the project or its users, along with any remaining suggested remediation measures. Diagrams are included at the end of each report to help users understand the interactions which occur within the project.

Background

HackSafe was commissioned by SAJA to perform an audit of smart contracts:

- <https://etherscan.io/token/0x698C6aC9CA5f16cAbC5a636D3a619329c0958cBA#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 understood 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.

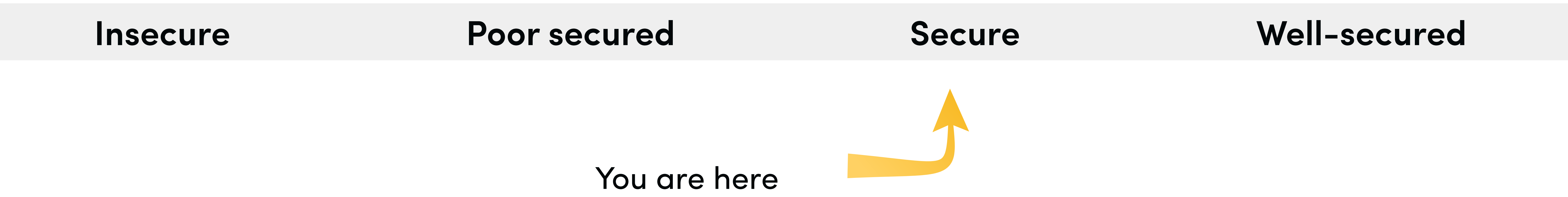
Contract Details

Token contract details for 04.02.2023

Token Type	: DEFI
Contract name	: Saja
Contract address	: 0x698C6aC9CA5f16cAbC5a636D3a619329c0958cBA
Total supply	: 1,000,000,000,000,000,000
Token ticker	: Saja
Decimals	: 9
Token Holders	: 3,974
Transactions count	: 15,449
Compiler version	: v0.6.12+commit.27d51765
Contract deployer address	: 0xafb0a9a275d015a87dd603f71991cc1b2fa60ad7
Owner address	: 0x00

Audit Summary

According to the standard audit assessment, Customer`s solidity smart contracts are “**Secure**”. This token contract does not contain owner control as ownership has been renounced, which do make it fully decentralized.



We used various tools like Slither, Mythril and Remix IDE. At the same time this finding is based on critical analysis of the manual audit. All issues found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the issues checking status.

We found 0 critical, 0 high, 1 medium and 1 low.

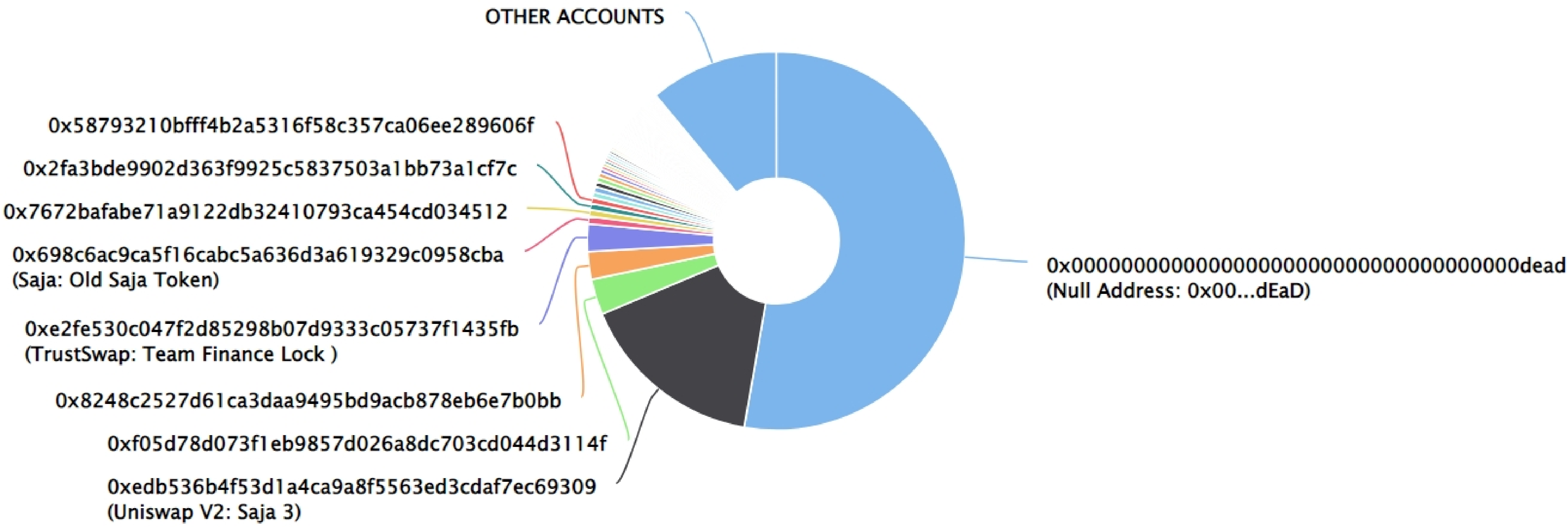
SAJA Token Distribution

💡 The top 100 holders collectively own 88.98% (889,767,952,258,346,000.00 Tokens) of Saja

💡 Token Total Supply: 1,000,000,000,000,000.00 Token | Total Token Holders: 3,974

Saja Top 100 Token Holders

Source: Etherscan.io



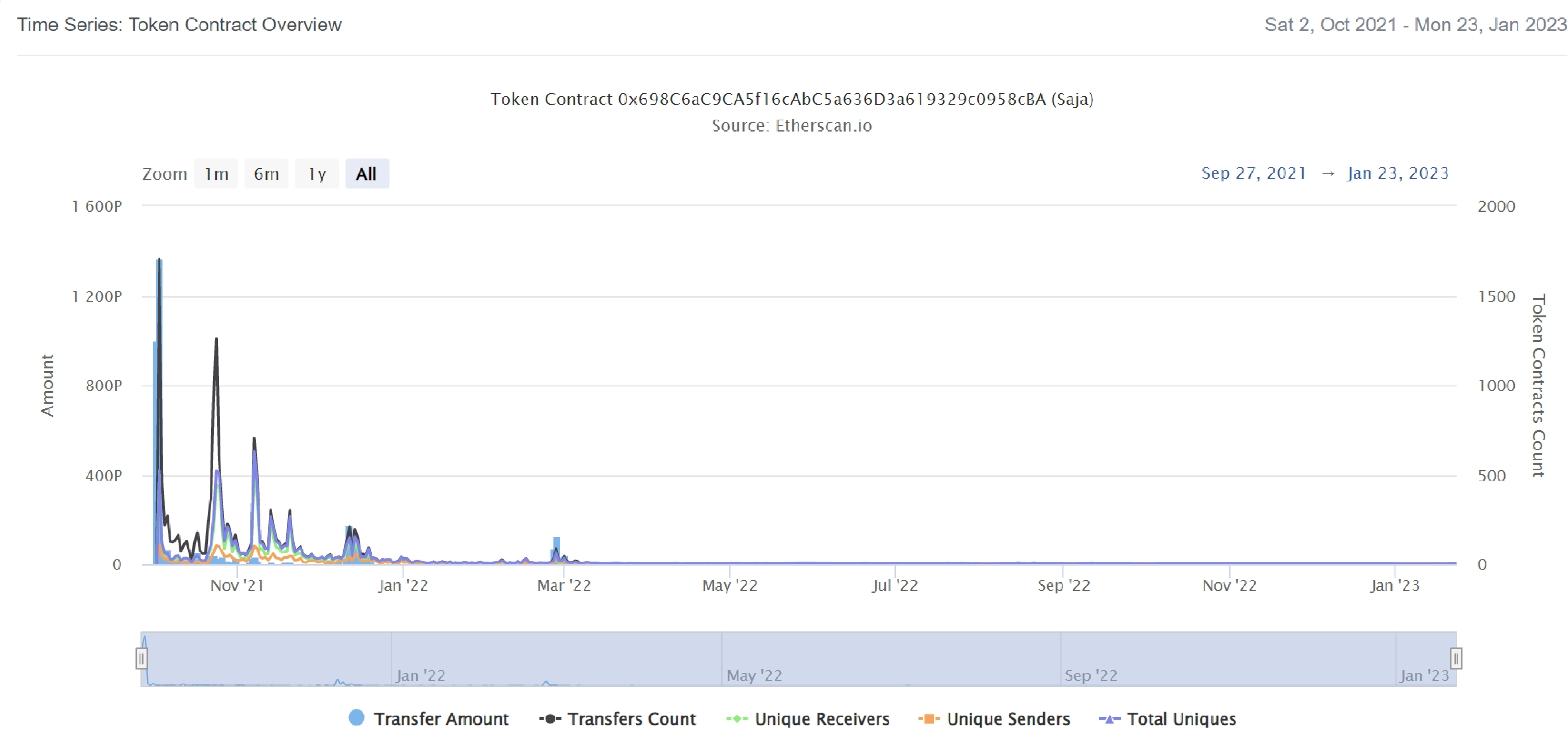
SAJA Token Top 20 Token Holders

(A total of 889,767,952,258,346,000.00 tokens held by the top 100 accounts from the total supply of 1,000,000,000,000,000.00 token)

Rank	Address	Quantity (Token)	Percentage
1	Null Address: 0x00...dEaD	527,344,207,004,860,000.566477656	52.7344%
2	📄 Uniswap V2: Saja 3	159,542,470,622,968,000.159087248	15.9542%
3	0xf05d78d073f1eb9857d026a8dc703cd044d3114f	30,429,707,245,712,200.124649373	3.0430%
4	0x8248c2527d61ca3daa9495bd9acb878eb6e7b0bb	23,683,381,005,069,200.887853426	2.3683%
5	📄 TrustSwap: Team Finance Lock	23,428,204,484,893,900.339527299	2.3428%
6	📄 Saja: Old Saja Token	6,529,969,776,279,650.788086339	0.6530%
7	0x7672bafabe71a9122db32410793ca454cd034512	5,513,586,591,279,710.421504541	0.5514%
8	0x2fa3bde9902d363f9925c5837503a1bb73a1cf7c	5,409,053,452,869,880.208738263	0.5409%
9	0x58793210bfff4b2a5316f58c357ca06ee289606f	5,064,532,865,519,950.046013437	0.5065%
10	0xfeb630eadd1a6fda3beb3c5511351976f54bef3e	4,791,489,444,946,510.435816795	0.4791%
11	0xd1c335395ddc9bba1dd0a6eab8d91a8e29d1dcd0	4,766,546,669,758,190.405669177	0.4767%
12	0x3830d6d93cbce37ea4f59337cbc8e505d9578aa1	4,353,442,208,538,730.741650808	0.4353%
13	0xc661a2384b1e25bff4a64843783bf127c1a146d2	4,135,580,561,141,410.820318515	0.4136%
14	0xae1ca854402d95f4c6733ce06bc5ded87f22c05f	3,854,286,903,942,560.788883884	0.3854%
15	0x9fd1c42285ca0778443014ca7e51d6457bb0a174	3,318,900,496,981,280.053942093	0.3319%
16	0xda6df16f6341c6303ec33d09059ce9e410692d48	2,819,152,280,785,990.379251914	0.2819%
17	0x9f2a163be07f2b269b13c76c5d077fe44d625577	2,585,515,086,517,190.448069024	0.2586%
18	0xc6c8f8a3de3620cc118346493476962acdae2dd0	2,573,129,606,892,320.653018452	0.2573%
19	0xf3da78fa8fa72f96185feb486e997150f208b8a7	2,340,723,300,730,850.030791439	0.2341%
20	0xed97887912912b7817126d7c571fca58dae966ca	2,338,271,223,628,230.690633988	0.2338%

SAJA Token Distribution

SAJA Contract Overview



Contract functions details

+[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 #
- [Pvt] _functionCallWithValue #

+Ownable (Context)

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

Contract functions details

- modifiers: onlyOwner

-[Pub] unlock #

+Saja (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

-[Pvt] _transferBothExcluded #

-[Pub] excludeFromFee #

- modifiers: onlyOwner

-[Pub] includeInFee #

- modifiers: onlyOwner

-[Ext] setFees #

- modifiers: onlyOwner

-[Ext] setMaxTxPercent #

- modifiers: onlyOwner

-[Ext] <Fallback>(\$)

-[Pvt] _reflectFee #

-[Pvt] _getValues

-[Pvt] _getTValues

-[Pvt] _getRValues

Contract functions details

- [Pvt] _getRate
- [Pvt] _getCurrentSupply
- [Pvt] _takeLiquidity #
- [Pvt] calculateTaxFee
- [Pvt] calculateLiquidityFee
- [Pvt] removeAllFee #
- [Pvt] restoreAllFee #
- [Pub] isExcludedFromFee
- [Pvt] _approve #
- [Pvt] _transfer #
- [Pvt] _tokenTransfer #
- [Pvt] _transferStandard #
- [Pvt] _transferToExcluded #
- [Pvt] _transferFromExcluded #

(\$) = payable function

= non-constant function

Issues Checking Status

No.	Title	Status
1.	Compiler error	Passed
2.	Missing Input Validation	Passed
3.	Race conditions and Reentrancy. Cross-function race conditions.	Passed
4.	Possible delays in data delivery	Passed
5.	Oracle calls.	Passed
6.	Timestamp dependence.	Passed
7.	Integer Overflow and Underflow	Passed
8.	DoS with Revert.	Passed
9.	DoS with block gas limit.	Medium Issue
10.	Methods execution permissions.	Passed
11.	Economy model of the contract.	Passed
12.	Private use data leaks.	Passed
13.	Malicious Event log.	Passed
14.	Scoping and Declarations.	Passed
15.	Uninitialized storage pointers.	Passed
16.	Arithmetic accuracy.	Passed
17.	Design Logic.	Passed
18.	Safe Open Zeppelin contracts implementation and usage.	Passed
19.	Incorrect Naming State Variable	Passed
20.	Too old version	Low issue

Severity Definitions

Risk Level	Description
Critical	Critical vulnerabilities are usually straightforward to exploit and can lead to assets loss or data manipulations.
High	High-level vulnerabilities are difficult to exploit; however, they also have a significant impact on smart contract execution, e.g., public access to crucial functions
Medium	Medium-level vulnerabilities are important to fix; however, they can't lead to assets loss or data manipulations.
Low	Low-level vulnerabilities are mostly related to outdated, unused, etc. code snippets that can't have a significant impact on execution.

Security Issues

✔ Critical Severity Issues

No critical severity issue found.

✔ High Severity Issues

No high severity issue found.

✔ Medium Severity Issues

One medium severity issue found.

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.

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.

- **Recommendation**

Check that the excluded array length is not too big

✔ Low Severity Issues

One low severity issue found.

1. Old compiler version

- **Description**

Contract has been deployed using too old solidity version.

- **Recommendation**

It is advisable to deploy contract using any of the latest version of solidity

Centralization

Owner Privileges :

- SAJA Contract:
 - Owner can change fees.
 - Owner can change the maximum transaction amount.
 - Owner can exclude from the fee.
 - Owner can lock and unlock. By the way, using these functions the owner could retake privileges even after the ownership was renounced.

This smart contract has some functions which can be executed by the admin (Owner) only. If the admin wallet private key would be compromised, then it would not create trouble, as smart contract ownership has been renounced. Following are the owner function:

- `renounceOwnership`
- `transferOwnership`
- `lock`
- `excludeFromReward`
- `includeInReward`
- `excludeFromFee`
- `includeInFee`
- `setFees`
- `setMaxTxPercent`

Conclusion

Smart contract contains low and medium severity issues! The further transfer and operations with the fund raised are not related to this particular contract.

HackSafe 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.