Smart Contract Security Audit

Audit details:

Audited project:	Shield Network
Deployer address:	0x13895273bbbb453c9fdf6c6d7f9438eb1ecd9c5c
Client contacts:	Shield Network team
Blockchain:	Binance Smart Chain
Project website:	http://ShieldNetwork.io

April, 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 Shield Network to perform an audit of smart contracts:

- *https://bscscan.com/address/0x0e690ee6fcc26bc09fed2d2287268c23d4a81e42#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

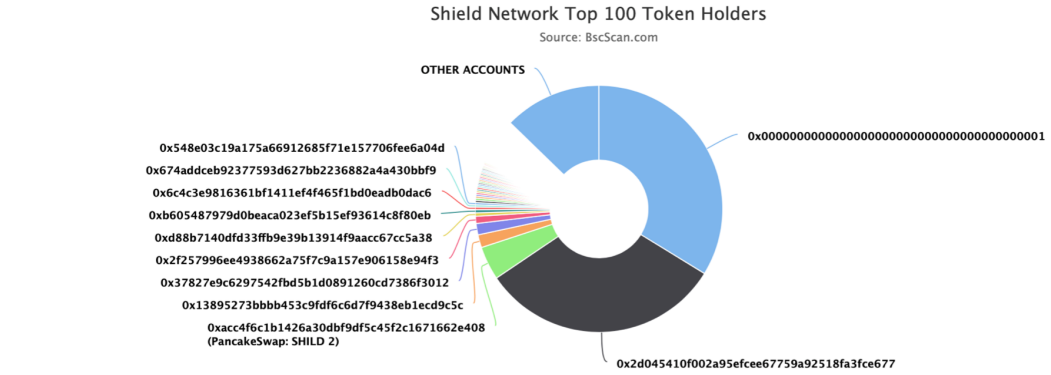
Token contract details for 17.04.2021.

Contract name:	Shield Network
Contract address:	0x0e690ee6fcc26bc09fed2d2287268c23d4a81e42
Total supply:	1_000_000_000_000_000_000_000_000_000_000
Token ticker:	SHILD
Decimals:	18
Token holders:	2939
Transactions count:	8685
Top 100 holders dominance:	87.28 %
Contract deployer address:	0x13895273bbbb453c9fdf6c6d7f9438eb1ecd9c5c
Contract's current owner address:	0x13895273bbbb453c9fdf6c6d7f9438eb1ecd9c5c
Current reflect fee:	2 percent
Total fees:	24_616_262_935_166_147_478_558_175_952
Deployed at transaction:	0xb639a8ecf56b328f3dd6120570086d9e81d24fb7f877de1a4e4ddbe7e39e5f97

Shield Network token distribution

The top 100 holders collectively own 87.28% (872,842,647,797.68 Tokens) of Shield Network

Token Total Supply: 1,000,000,000,000.00 Token | Total Token Holders: 2,940

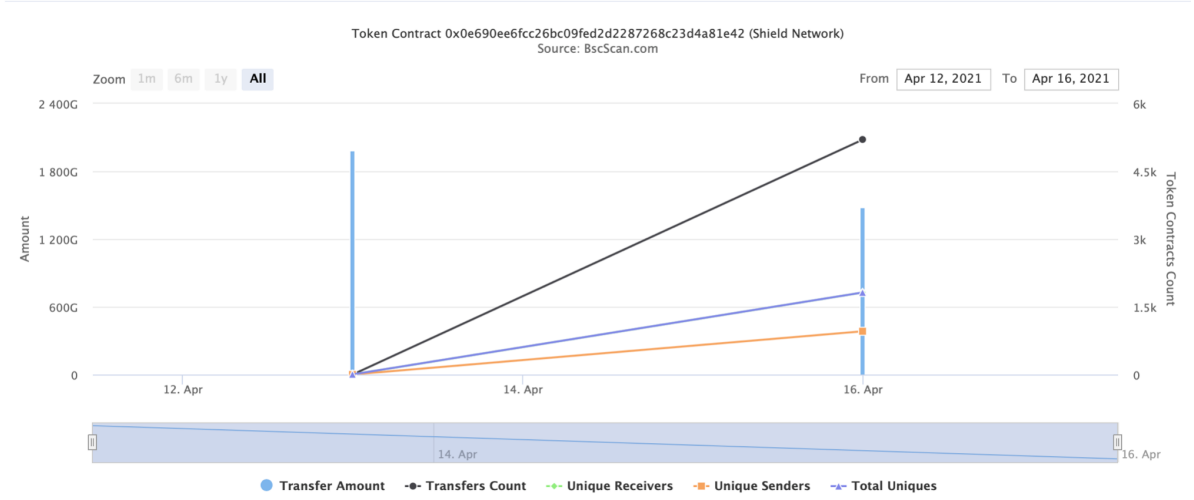


(A total of 872,842,647,797.68 tokens held by the top 100 accounts from the total supply of 1,000,000,000,000.00 token)

Shield Network contract interaction details

Time Series: Token Contract Overview

Tue 13, Apr 2021 - Fri 16, Apr 2021



Shield Network top 10 token holders

Rank	Address	Quantity	Percentage
1	0x0000000000000000000000000000000000000001	337,616,386,489.087	33.7616%
2	0x2d045410f002a95efcee67759a92518fa3fce677	317,933,333,333.65	31.7933%
3	PancakeSwap: SHILD 2	43,979,061,991.9467	4.3979%
4	0x13895273bbbb453c9fdf6c6d7f9438eb1ecd9c5c	16,733,333,333.35	1.6733%
5	0x37827e9c6297542fbd5b1d0891260cd7386f3012	14,862,038,725.623	1.4862%
6	0x2f257996ee4938662a75f7c9a157e906158e94f3	9,345,209,951.32954	0.9345%
7	0xd88b7140dfd33ffb9e39b13914f9aacc67cc5a38	4,532,083,045.16279	0.4532%
8	0xb605487979d0beaca023ef5b15ef93614c8f80eb	4,118,001,116.9402	0.4118%
9	0x6c4c3e9816361bf1411ef4f465f1bd0eadb0dac6	3,263,136,726.80297	0.3263%
10	0x674addceb92377593d627bb2236882a4a430bbf9	3,016,745,990.19902	0.3017%

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

+ SHIELD (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
- [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
- [Ext] setFeeRate #
  - modifiers: onlyOwner

($) = 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:

Use EnumerableSet instead of array or do not use long arrays.

Owner privileges

- ❏ Owner can change the fee rate.

```
function setFeeRate() external onlyOwner() {
    reflectFees = 2;
}
```

Conclusion

Smart contracts do not contain high 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.